Associations between women's exposure to intimate partner violence and physical health outcomes

A structured literature review and analysis of the 2019 New Zealand Family Violence Study dataset

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Abstract

Background: Intimate partner violence (IPV) against women is a social and public health issue internationally, including in New Zealand (NZ). Types of IPV include physical, sexual, and psychological abuse, as well as controlling behaviours and economic abuse. Research has documented the impact of IPV experience on acute physical health and pregnancy-related outcomes, as well as longer-term mental health outcomes. More recently, IPV is receiving increased recognition as an important causal factor for a range of long-term physical health problems. This thesis explores the gap in NZ-based research on IPV exposure and health outcomes, and contributes to filling knowledge gaps about the association between IPV and health outcomes internationally.

Methods: This study was conducted via a structured literature review and secondary analysis of data from the 2019 New Zealand Family Violence study (NZFVS). The structured literature review expanded and updated Stubbs and Szoeke's (2021) systematic review to determine what is currently known about associations between women's exposure to IPV and non-communicable physical health outcomes in the published literature, and to identify control and covariates commonly used in these studies. The structured literature review comprised 48 studies; an expanded analysis of thirty-six studies (published 2012-2019) included in Stubbs and Szoeke (2021), and twelve studies published from 2019 to April 2021.

The secondary analysis utilised data from 1,431 ever-partnered women from the population-based NZFVS dataset to undertake a cross-sectional examination of associations between IPV exposure (by any IPV, IPV severity, IPV types, and multiple types of IPV) and health outcomes (including self-rated physical health, pain-related experiences, and diagnoses of health conditions) among NZ women.

Findings: The structured literature review reinforced previous findings; while many studies indicated that IPV exposure is associated with poor physical health outcomes, these associations and their sizes varied due to a wide range of IPV measurements assessed and differential characteristics of samples used. The literature review also highlighted a complex relationship between IPV exposure, physical health, mental health, and health risk behaviours.

Analysis found that IPV is highly prevalent among NZ women, with 43% of the sample reporting experiencing any IPV over their lifetime. This includes high prevalence of less 'visible' types such as psychological IPV, controlling behaviours, and economic abuse. Experience of multiple IPV types is also highly prevalent; 64% of women who experienced IPV experienced two or more IPV types. Women's experience of any IPV, as well as specific types of IPV, were significantly associated with increased risks of experiencing worse health outcomes. For example, women who experienced any lifetime IPV were almost twice as likely to report poor general health (AOR 1.79 [1.30-2.47]) and recent pain or discomfort (AOR 1.75 [1.33-2.30]), and nearly three times as likely to have a diagnosed mental health condition (AOR 2.74 [2.03-3.71]). Further, women who experienced severe physical IPV or multiple types of IPV were more likely to experience worse health outcomes.

Conclusions: Both the structured literature review and data analysis found that women's exposure to IPV is associated with increased risks for experiencing worse physical health outcomes, and findings highlighted the importance of considering the role of different IPV types, severity, and multiple types. NZ's healthcare services need to be mobilised and engaged to proactively identify and support management of IPV exposure given its frequency within the population and strong associations with poor physical health outcomes.

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I would also like to acknowledge all those who contributed to the design and implementation of the NZFVS; your work enabled me to confidently undertake a secondary analysis using an excellent dataset.

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Abbreviations

AAS	Abuse Assessment Screen
AHR	Adjusted hazard ratio
AIRR	Adjusted incidence rate ratio
AOR	Adjusted odds ratio
APRR	Adjusted prevalence rate ratio
ARR	Adjusted rate ratio
BM	Brooklyn Mellar
CAS	Composite Abuse Scale
CSS	Central sensitivity syndromes
CTS	Conflict Tactics Scale
CTS2	Revised Conflict Tactics Scale
CVD	Cardiovascular disease
FVDRC	Family Violence Death Review Committee
HDL	High-density lipoprotein
HPA	Hypothalamic-pituitary-adrenal
HRQoL	Health-related quality of life
IPV	Intimate partner violence
JF	Associate Professor Janet Fanslow (co-supervisor)
LH	Dr Ladan Hashemi (co-supervisor)
MELAA	Middle Eastern/Latin American/African
MeSH	Medical Subject Headings
MOH	New Zealand Ministry of Health
MOJ	New Zealand Ministry of Justice
MPAB	Measure of Psychologically Abusive Behaviors
NA	Not applicable
NR	Not reported
NZ	New Zealand

NZFVS	2019 New Zealand Family Violence Survey
OR	Odds ratio
PASS	Partner Abuse Symptom Scale
Phys.	Physical
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PSU	Primary sampling units
Psych.	Psychological
PTSD	Post-traumatic stress disorder
PVS	Partner Violence Screen
RR	Relative risk
STaT	"Slapped, Threatened, and Throw" instrument
STIs	Sexually transmitted infections
SVAWS	Severity of Violence Against Women Scales
Te Aorerekura	Te Aorerekura: National Strategy to Eliminate Family Violence and Sexual Violence
TBI	Traumatic brain injury
VAW Study	New Zealand Violence Against Women Study (2003)
VS	Dr Vanessa Selak (co-supervisor)
WEB	Women's Experience with Battering Scale
WHO	World Health Organization
WHO MCS	World Health Organization Multi-Country Study

Chapter 1. Introduction

This chapter introduces the thesis, beginning by providing a background of intimate partner violence (IPV), which describes IPV as a public health issue, methodological considerations for estimating IPV prevalence, different types of IPV, and risk factors and impacts of experiencing IPV. It will then present the research focus and outline the rationale for the study undertaken, followed by the aim and specific objectives of this project. Finally, it will outline the structure of this thesis.

1.1. Background

1.1.1. Definition of IPV

Alongside other types of family or domestic violence (such as child abuse and elder abuse), IPV is an important issue globally. IPV (also known as spouse or partner abuse) is defined by the World Health Organization (WHO) as "behaviour within an intimate relationship that causes physical, sexual or psychological harm, including acts of physical aggression, sexual coercion, psychological abuse and controlling behaviours" (WHO, 2017, Definition section). Violence perpetrated by both current and former spouses and partners is incorporated in this definition (WHO, 2017).

1.1.2. IPV against women is a global public health issue

Violence by an intimate partner is the most widespread type of violence against women internationally, and IPV is overwhelming experienced by women (WHO, 2021b). IPV occurs in all countries and across all socioeconomic, religious, and cultural groups (WHO, 2012). IPV has been identified and addressed as a global public health, social policy, and human rights issue over the past 30 years; the United Nations ratified the Declaration on the Elimination of Violence against Women in 1993 and set targets in the Sustainable Development Goals for eliminating public and private violence against women and girls in 2015 (Devries et al., 2013; WHO, 2021b).

Although women can be violent to their male intimate partners and IPV can take place in same-sex relationships, male partners or ex-partners are the most common perpetrators of violence against women (WHO, 2012). In contrast, men are more likely to be victims of violence from strangers or acquaintances (WHO, 2012). The New Zealand Crime and Victims Survey (NZCVS) recently found that women were almost four times more likely to experience IPV than men (Ministry of Justice [MOJ], 2021).

Global estimates from the WHO Multi-Country Study on Women's Health and Domestic Violence (WHO MCS) indicated that around 15-71% of all women had experienced physical and/or sexual IPV in their lifetime, and 4-54% were subjected to physical and/or sexual IPV within 12 months prior to the survey (García-Moreno et al., 2006). IPV is also considered to be highly prevalent in New Zealand (NZ); earlier estimates found that 55% of women had experienced any IPV over their lifetime (Fanslow & Robinson, 2011). There is evidence for substantial ethnic inequities in IPV victimisation in NZ. Recent surveys have indicated that compared with the national average, Māori experience almost three times more IPV incidents per 100 adults and report twice the proportion of current-partner violence; though these figures were not stratified by gender (MOJ, 2018). Thus, consideration of Māori women's experiences of IPV is crucial in understanding IPV in NZ.

1.1.3. Methodological considerations for estimating IPV prevalence

Global prevalence rates represent a broad range of estimates encompassing regional variations, which are likely partly due to real differences in IPV prevalence between populations, but are also due to methodological factors (García-Moreno et al., 2006). Researchers have historically faced difficulties with measuring the magnitude of IPV and producing comparable data to inform policy and monitor responses and progress (Devries et al., 2013). Issues with interpretation and comparability of IPV-related data continue to persist due to inconsistencies in IPV definitions and measures used in data collection, and differences in sample settings and target populations (Krug et al., 2002). Nevertheless, 'gold standard' practices for assessing prevalence and broad patterns of IPV are growing in consensus, including purpose-built and representative population-based surveys for data collection, and research methods including private in-person interviews where women are asked about their experiences of violent behaviours (Devries et al., 2013; WHO, 2001). Research on IPV should follow strict ethical and methodological guidelines as recommended by WHO, in order to ensure participant and interviewer safety and to maximise IPV disclosure rates (Ellsberg et al., 2001). Data from sources such as Women's Refuge or Police are inadequate for estimating IPV prevalence as they only capture those using services (Fanslow, Gulliver, et al., 2021). As such, large population-based surveys are essential to understanding the true prevalence of IPV among populations, including at the national level.

1.1.4. Types of IPV

In gathering data on IPV experiences, the nature of behaviours experienced by respondents is a key consideration. IPV can be categorised as a number of types which span a range of harm-causing behaviours within an intimate relationship, such as those outlined in Table 1.1.

Table 1.1.

Types of IPV and Related Behaviours.

Type of IPV	Examples of related behaviours
Physical	slapping, kicking, beating
Sexual	forced sexual intercourse or sexual coercion
Psychological (or emotional)	intimidation, threats of harm, belittling or humiliating
Controlling behaviours	isolating a person from family and friends, monitoring their movements and restricting their access to resources or services

Note. Adapted from Krug et al. (2002).

Most research has focused on gathering data on the prevalence and impacts of physical and/or sexual IPV (Devries et al., 2013). In turn, other types of IPV (such as psychological abuse and controlling behaviours) have been underexplored in research and practice, due to "focus on gaining recognition of physical and sexual IPV, and the challenges associated with the measurement of these behaviours" (Fanslow, Malihi, et al., 2021a, p. 1). Evidence has suggested that controlling behaviours, sometimes considered a type of psychological IPV, are a pervasive feature of abusive relationships and are experienced overwhelmingly by women (Aizpurua et al., 2021; Myhill, 2015). Researchers consider controlling behaviours as characteristic of coercive control' or 'intimate terrorism, which denote a behavioural pattern or dynamic that differentiates IPV from sporadic and non-systematic cases of "situational couple violence" (Aizpurua et al., 2021; Myhill, 2015). Financial or economic abuse is also increasingly considered as a key type of IPV. NZ's 1995 Domestic Violence Act broadened the list of behaviours it described as psychologically abusive to include economic abuse, defining this as "denying or limiting access to financial resources, or preventing or restricting employment opportunities or access to education" (Jury et al., 2017, p. 70). These non-physical behaviours of IPV highlight that not all those who experience IPV may exhibit physical evidence of abuse, and that a broad conception of IPV is necessary.

While spectrums of violence involve complex patterns that are unique to different women's experiences, most women do not experience one type of IPV in isolation and multiple types often overlap (Dutton et al., 2005). For example, physical IPV has been found to commonly be accompanied by psychological IPV, and also frequently by sexual abuse (Krug et al., 2002). There is also increasing recognition of the cumulative impact of experiencing multiple types of abuse, comprising different types of IPV in addition to other forms of abuse (such as child abuse) across the life course. This phenomenon has been described using different terms such as cumulative abuse, polytraumatisation, polyvictimisation, accumulated trauma/abuse, and cooccurring abuse (Scott-Storey, 2011).

1.1.5. Risk factors for experiencing IPV

Substantial research has explored the risk factors for women's IPV victimisation. For individuals, witnessing IPV in childhood, low socioeconomic status, low levels of education, previous violence victimisation, and mental and neurological disorders are associated with increased risk for victimisation (WHO, 2012; 2017). At a broader level, women in communities with high rates of poverty, crime, violence and unemployment are at increased risk for experiencing IPV, alongside those in communities with social norms supportive of violence and low social status of women (WHO, 2012; 2017). NZ-based research has also found that those with disabilities are at greater risk of experiencing most types of IPV (Fanslow, Malihi, et al., 2021b). However, risk factors vary widely across individual and partner contexts and cultural settings, and the etiology for different types of IPV types has insofar been underexplored (Yakubovich et al., 2018). Understanding of risk factors for experiencing IPV can assist with developing targeted prevention and intervention frameworks for responding to IPV at local and national levels.

1.1.6. Consequences of IPV

Exposure to IPV has been linked with a range of different physical and mental health outcomes. Physical consequences of IPV are commonly understood as acute and visible impacts, often from blunt force trauma or strangulation, and include injuries (such as fractures, traumatic brain injury, burns and lacerations), permanent disability, and sometimes death (Black, 2011). International estimates suggest that between 40-70% of murdered women were killed by their intimate partners, often within the context of an abusive relationship (Krug et al., 2002). Between 2009-2018, 125 IPV deaths were recorded in NZ, of which three-quarters of offenders were men and 70% of victims were women (Family Violence Death Review Committee [FVDRC], 2021). Of the women responsible for killing men, 81% were classified as women killing their predominantly aggressive partner, often in self-defence (FVDRC, 2021). Ethnic inequities have also been found in IPV deaths; between 2009 and 2015 Māori were three times more likely to be killed or offenders than non-Māori (FVDRC, 2017).

Despite historically receiving less research focus than these immediate impacts, IPV is gaining recognition as an important causal factor for a range of long-term physical health problems (Campbell, 2002; Dillon et al., 2013; Stubbs & Szoeke, 2021).

1.2. Research Focus

The present research will explore associations between women's experience of IPV and physical

health outcomes via a structured literature review and analysis of a NZ population-based dataset. The structured literature review will comprise an expanded analysis of studies included in a recently published systematic literature review on associations between women's exposure to IPV and physical health outcomes, and also undertake an updated systematic literature review to extend the date range for included studies. Thereafter, secondary analysis will be conducted using data from the 2019 New Zealand Family Violence (NZFVS) survey to describe IPV prevalence among NZ women and examine associations between IPV exposure and health outcomes.

While IPV is also a problem for men, this study will focus on the association between *women's* exposure to IPV and physical health outcomes. There are myriad reasons why IPV research should be analysed separately by gender, primarily as men and women have different risk and response profiles for IPV victimisation. For example, negative consequences are found to be significantly worse for women than men; women are more likely to be injured by intimate partners, suffer from more severe IPV types, and are more likely to fear for their lives than male victims (Caldwell et al., 2012; Krug et al., 2002).

1.3 Rationale

Compared with the long-term consequences of violence in adulthood, the long-lasting impact of violence experienced in childhood on physical health outcomes has been relatively well researched (Krug et al., 2002; Moffitt & Klaus-Grawe 2012 Think Tank, 2013). For example, there are consistent findings to suggest children who have been exposed to violence are at increased risk for later cardiovascular diseases (CVDs); however, it is posited that childhood and adult exposure to violence may have different biological pathways and should therefore be explored separately (Liu et al., 2020; Suglia et al., 2015).

Extensive reviews have pointed out that studies on the health impacts of experiencing IPV have tended to focus on pregnancy-related and mental health outcomes (Coker et al., 2002; Stubbs & Szoeke, 2021; WHO, 2017). There are established links between exposure to IPV in pregnancy and health outcomes for both mothers and infants, including increased risk of miscarriage, preterm delivery, low birthweight, postnatal depression, and reduced breastfeeding rates (Chaves et al., 2019; Hill et al., 2016; Pastor-Moreno et al., 2020). Strong evidence suggests that exposure to IPV has short and long-term mental health effects, with women exposed to IPV suffering higher rates of depression, anxiety, emotional distress, substance abuse, post-traumatic stress disorder (PTSD), suicidal ideation, self-harm

and suicide than those who have not experienced IPV (Campbell, 2002; Dillon et al., 2013; WHO, 2012). In 2006, it was noted that the mental health burden of IPV had been thoroughly explored and that the following decade was well positioned to focus on the pathways between IPV and adverse physical health outcomes (Dutton et al., 2006). Physical health outcomes related to communicable disease, particularly risk-related behaviours for HIV and other sexually transmitted infections (STIs), have also been well explored in the literature to date (Bacchus et al., 2018; Stubbs & Szoeke, 2021; WHO, 2012; 2017). There have been calls for research to further the understanding of long-term implications of experiencing different types of IPV and their cumulative impact, and the effect of IPV severity and intensity (Dillon et al., 2013).

Previous research in NZ has found IPV was significantly associated with health problems including poor self-rated health, physical and mental health issues, and increased medication use; however, this research was now conducted almost two decades ago (Fanslow & Robinson, 2004). Further, this study was limited by excluding women over 64 years old (which may not have captured long-term health consequences), only assessing exposure to physical and sexual IPV, and not gathering information on specific health conditions. To the best of the author's knowledge, no research has since attempted to explore associations between women's experience of IPV and physical health consequences in NZ. Therefore, this thesis will address this gap by updating and extending earlier NZ-based research on IPV exposure and health outcomes, in addition to making a contribution towards strengthening and filling knowledge gaps within the IPV research field internationally.

It is important to understand these long-term potential health consequences in order to increase the relevance and priority of preventing or early intervention in IPV. Healthcare providers have been identified as uniquely positioned to respond to IPV, particularly as victimised women have been found to have high rates for healthcare utilisation, and may present to healthcare settings before criminal or social services (Campbell, 2002; García-Moreno et al., 2015). However, healthcare providers currently have limited engagement and under-identify IPV even where healthcare is sought for IPV-related problems; improved understanding of health consequences may improve IPV identification and response practices for improved safety and health (Black, 2011; Gear et al., 2020). A further comprehensive understanding of the health outcomes related to IPV could provide much needed insights on the development of strategies to intercept or minimise the pathways to poor health outcomes which would be relevant for healthcare professionals, those who work in IPV response settings, and policy advisors and leaders (García-Moreno et al., 2015).

Given the importance of understanding the physical health outcomes of IPV for prevention and intervention strategies, the present research could make a contribution to addressing IPV in the NZ context. Correspondingly, by seeking to explore associations between IPV and a range of health outcomes, this study may offer greater context to the causes or contributors of adverse health outcomes, supporting the alleviation of NZ's disease burden.

1.4. Aim

To explore associations between women's exposure to IPV and physical health outcomes.

1.5. Objectives

Objective 1: To determine what is currently known about the associations between women's exposure to IPV and non-communicable physical health outcomes from published literature.

Objective 1a: To identify the exposure and control variables or covariates that have been commonly used in published analyses of associations between IPV and non-communicable physical health outcomes.

Objective 2: To assess the associations between lifetime IPV exposure and health outcomes among women in New Zealand, according to experience of any IPV, IPV severity, IPV type, and multiple types of IPV experienced.

1.6. Thesis Structure

Succeeding this introduction, this thesis is comprised of the following chapters:

Chapter 2 introduces and contextualises the structured literature review, which addresses objectives 1 and 1a, and includes a critical overview of existing literature reviews that investigate the associations between women's exposure to IPV and physical health outcomes.

Chapter 3 describes the methods for the structured literature review.

Chapter 4 presents the results of the structured literature review by individual studies and narrative synthesis of findings.

Chapter 5 discusses and concludes the structured literature review, including key findings, strengths and limitations, and implications for this research.

Chapter 6 describes the methods for the analysis of data from the 2019 NZFVS, which will address Objective 2 of this thesis. This chapter introduces the 2019 NZFVS and details survey design, sample selection, and methods for its implementation. It then describes the NZFVS measurements used in the present study, and how these were operationalised for the analysis.

Chapter 7 presents the results of the NZFVS data analysis, beginning with descriptive statistics and then detailing the findings per objective.

Chapter 8 discusses the findings of the NZFVS data analysis in relation to the literature review findings and other NZ and international research. This chapter discusses the strengths and limitations of the present study and makes suggestions for future research. Policy and practice recommendations based on the combined findings of the literature review and the NZFVS analysis are also discussed.

Chapter 9 briefly concludes the thesis in relation to the study rationale and objectives.

Chapter 2. Background to the Structured Literature Review

2.1 Introduction

The present structured literature review will explore what is currently known about non-communicable physical health outcomes associated with IPV. In order to compare findings and to understand factors that may be important in considering how experience of IPV may influence health, IPV measures and confounding variables commonly used in the literature are also explored. The findings of this literature review will inform the secondary data analysis undertaken later in this thesis.

This chapter will introduce the structured literature review in order to contextualise the research field and provide background justification for the methods outlined in Chapter 3. Firstly, this chapter will restate the objectives for this structured literature review. It will then describe findings from and critically assess existing literature reviews pertaining to IPV exposure and physical health outcomes.

2.2. Objectives of the Structured Literature Review

Objective 1: To review the published literature to determine what is currently known about the associations between women's exposure to intimate partner violence and non-communicable physical health outcomes.

Objective 1a: to identify and critically assess the exposure measures and confounding variables that are commonly used in the analysis of associations between IPV and physical health outcomes.

2.3. Existing Reviews of the Literature

Three key literature reviews that successively described the lineage of research exploring the association between exposure to IPV and physical health outcomes were identified (Campbell, 2002; Dillon et al., 2013; Stubbs & Szoeke, 2021). Given their comprehensiveness, these reviews were selected for discussion in order to illustrate key issues and developments within the field over the past few decades, and to highlight points of study design and methods that merit consideration going forward. In line with Objective 1, reviews that exclusively focused on mental health outcomes, substance use, or communicable diseases (with insufficient discussion of physical health outcomes) were considered for later discussions, but are not examined further here (e.g. Bacchus et al., 2018; Devries et al., 2014).

Although the present study does not focus on causal pathways, three additional systematic reviews that explored pathways between IPV exposure and physical health outcomes were included for discussion (Liu et al., 2020; Patton et al., 2021; Yim & Kofman, 2019). These recently published reviews were considered here as research on the causal pathways between experience of IPV and poor health outcomes may help to explain and substantiate associations found in other studies (especially those that cannot ascertain causation), and may also help to identify important analytical or contextual factors that sit along the pathway between IPV exposure and physical health outcomes.

Where applicable, the PRISMA statement's reporting guidelines for systematic reviews were utilised as a basis for critically assessing the quality of reporting in the following reviews (Page et al., 2021).

2.3.1. Associations between IPV exposure and physical health outcomes

Campbell's (2002) review in *The Lancet* was one of the first publications to review the emerging field of the health outcomes of IPV, and has since become one of the most heavily cited articles on the topic. This short but landmark review explored health consequences of IPV through the categories of physical health, forced sex, abuse during pregnancy, mental health effects, and use of medical care (Campbell, 2002). Campbell (2002) found that IPV is a significant direct and indirect risk factor for numerous physical health problems, including chronic pain, central nervous system, gastrointestinal, and cardiovascular issues. Among other studies that informed the narrative review, Campbell (2002) specifically identified five "roughly comparable" studies that assessed associations between IPV and physical health symptoms, of which the findings generally suggested that IPV had significant short and long-term physical health impacts (Coker et al., 2000; Leserman et al., 1998; McCauley et al., 1995; Plichta, 1996). Campbell (2002) noted that women who experienced IPV utilised more healthcare than non-abused women, including an increased number of prescriptions and more frequent hospital visits. The author proposed that mechanisms such as injuries, mental health disorders, fear and stress from IPV could produce physiological changes that lead to worse physical health outcomes, but signalled that these factors had not yet been thoroughly explored (Campbell, 2002).

The review's study selection methods and criteria were briefly reported, identifying studies published in English during the preceding decade with focus on findings replicated outside the United States, including "…population-based investigations or studies with sufficient sample size, minimal selection or response bias, controlled comparisons, or rigorous qualitative methods that have been replicated in more than one sample" (Campbell, 2002, p. 1331). The review did not specify how many studies were included in total; however, the article did not position itself as a systematic review and likely included

the majority of relevant studies given the infancy of the field in 2002. Most of the included studies were cross-sectional and concentrated in the United States, suggesting minimal use of other study designs and little international research activity in this field at the time. Campbell made sporadic reference to IPV factors that were identified in particular studies which might have influenced health outcomes, such as different impacts by IPV types and possible dose-response relationships from severe IPV and combined physical and sexual IPV; negligible consideration of these factors in the studies likely limited the author's ability to draw conclusions. The importance of this article in facilitating discussion around health consequences of IPV at the time should not be understated, however the subsequent growth of research in this area internationally now permits more detailed and nuanced consideration of IPV factors and a range of health outcomes.

Dillon et al.'s (2013) review examined studies published between 2006 and 2012 that explored both mental and physical health effects of IPV. This comprehensive review reported the stringent search methods used to identify 75 studies from a range of sample settings. Importantly, the authors noted the high proportion of convenience samples used by the studies, with only 23 of 75 study settings (30.6%) drawn from the general population (Dillon et al., 2013). The second most common setting for included studies were domestic violence shelters (n=14), which likely disproportionately captured participants with existing physical and mental health problems or exposure to severe abuse. Only 3 studies from domestic violence shelter settings compared outcomes with non-abused women in the community; the reliance on samples with 100% IPV prevalence in the other 11 studies limited their value for determining IPV as a risk factor for health problems, as assessed health outcomes could not be compared with those unexposed to IPV. The authors reported that half of the studies in the review dealt exclusively with mental health outcomes (including depression, PTSD, anxiety, suicide/self-harm, and poor self-rated mental health), 32% of studies explored both mental and physical health outcomes, and only 13% of the studies exclusively focused on physical health (Dillon et al., 2013). As in Campbell (2002), the inclusion of both mental and physical health outcomes likely limited the authors' scope to discuss physical health outcomes, as the volume of mental health research dominated the findings.

Dillon et al. (2013) classified physical health using three high-level categories: functional physical health, self-perceived physical health, and chronic physical health conditions. Ten of the twelve studies that assessed the functional physical health status of women exposed to IPV found that these women had significantly lower levels of functional physical health than non-abused women, or compared with standard normal scores. Self-perceived physical health status was reported by eight studies, of which

seven found that exposure to different types of IPV was associated with poor health status. Seventeen studies analysed the association between IPV and chronic physical health conditions; IPV was significantly associated with chronic pain in nine of these studies but non-significant in four others, and use of pain medication also presented mixed results. Four studies reported on associations between IPV and somatoform and psychosomatic issues (including stomach pain, headaches, dizziness and muscular pain), though the differentiation from chronic pain is not explained. The authors did not report specific data for other mentioned studies that found associations between IPV and physical health problems, including those affecting cardiovascular, respiratory, and musculoskeletal systems, allergies, diabetes, malnutrition, and gastrointestinal issues (Dillon et al., 2013). In general, Dillon et al. (2013) found studies reported consistent associations between IPV exposure and poor health outcomes across methods (including several longitudinal studies), which were particularly evident for poor mental health outcomes. In addition to improved use of standardised IPV definitions and tools, the authors recommended that future research should examine different types of IPV, the cumulative impact of multiple types of IPV, and intensity or severity of IPV (Dillon et al., 2013).

Presented as a logical continuation of Dillon et al. (2013), Stubbs and Szoeke (2021) undertook an extensive systematic review of literature published between January 2012 to May 2019. The review employed a rigorous search methodology and included 52 articles that assessed the association between IPV and a wide range of physical health issues, categorised by: cardiovascular, endocrine, neurological, infectious diseases, substance use, health screening, health service utilisation, chronic diseases, and general physical health (Stubbs & Szoeke, 2021). The authors emphasised that long-term effects of IPV on physical health outcomes and health-related behaviours have been underexplored in the literature compared with mental health and pregnancy-related outcomes, and thus excluded these latter outcomes from their review. Of the three literature reviews explored here, Stubbs and Szoeke (2021) was the only one to identify as a systematic review, and the first to also include studies that primarily explored biological or physiological causal pathways (such as endocrine and inflammatory biomarkers) between IPV exposure and physical health outcomes. Overall, Stubbs and Szoeke (2021) found that exposure to IPV conferred increased risk for a range of physical health outcomes, including worse self-rated health, diabetes, chronic diseases, menopause symptoms, STIs, and health risk behaviours such as alcohol and drug abuse. However, findings on cardiovascular and endocrine outcomes were mixed. The authors noted that significant research has been conducted into the effects of IPV on HIV status and outcomes and transmission of STIs (Stubbs & Szoeke, 2021). Importantly, the reviewers emphasised the lack of consistency in studies' incorporation of different types of IPV

(especially psychological IPV) in analyses, and recommended that these definitional issues be addressed in research going forward.

It appears that Stubbs and Szoeke (2021) discarded an exclusion criterion from Dillon et al.'s review, which affected the types of studies included. Dillon et al. (2013) excluded, "articles focused on clinical samples […] where the specific clinical issues might have compromised generalisability of the results, including [...] studies that focused exclusively on women with specific health conditions (e.g., HIV-positive women) and women with specific exposure to additional trauma events (e.g., military veterans)" (Dillon et al., 2013, p. 3). Thus, Stubbs and Szoeke included several studies with samples prone to bias or compromised generalisability; this decision was not justified in-text and likely jeopardised generalisability among included studies. Aside from a summary table that described sample size and specific health effects examined by each included study, the review largely subscribed to narrative reporting. While presenting a valuable synthesis, the review did not include information expected of systematic literature reviews, such as high-level reports of sample settings or characteristics (e.g., mean sample sizes, proportions of study designs or locations), or report individual or pooled study results for comparison or quality assessment.

2.3.2. Pathways between IPV exposure and physical health outcomes

Yim & Kofman's (2019) systematic review explored 53 studies published between 2000 and 2018 on exposure to IPV and stress-related biological and psychological associations and pathways to physical health outcomes, presenting findings from a broad publication period in an attempt to encourage future research in the field. The authors argued that general research on stress cannot be directly applied to the IPV context, by attributing the uniqueness of IPV-related stress to "[...] the cycle of violence - a period of growing tension culminating in an act of violence followed by a phase of relative calm, which is once again followed by increasing tension" and citing a paucity of research specifically linking IPV-related stress and biopsychosocial pathways to health outcomes (Yim & Kofman, 2019, p. 10).

Reporting separately on biological and psychological stress-factors and their association with IPV exposure, the authors found that the biological literature provides emergent evidence of stress-related endocrine and immuno-inflammatory dysregulation, consistent with outcomes observed in chronically stressed individuals (Yim & Kofman, 2019). Endocrine studies almost exclusively measured cortisol and many used single cortisol measures; results were generally consistent with one study which found that chronically stressed individuals had flatter diurnal cortisol trajectories with lower morning cortisol, higher evening cortisol, and higher diurnal cortisol output (Yim & Kofman, 2019). Ten studies

examined immune/inflammatory markers; one study in postmenopausal women suggested that IPV-related cytokine dysregulation may be present years after women leave abusive relationships, and other studies found that stress accelerated HIV progression (Yim & Kofman, 2019). As noted by the authors, costlier biological studies had smaller sample sizes and thus limited statistical power (Yim & Kofman, 2019). Psychological stress studies included measurements of perceived stress (n=11), life-event stress (n=8), and chronic strain (n=17), for which the authors concluded that there were reasonably consistent associations between IPV and psychological stress. Yim and Kofman (2019) found that only 2 studies tested associations using both biological and psychological stress measures, and that few studies considered broader histories of abuse and trauma as key moderators outside of IPV. Overall, Yim & Kofman (2019) presented a high level of reporting detail and quality, capturing the emerging literature on key biological and psychological causal pathways between IPV and physical health outcomes.

Liu et al.'s (2020) integrative review explored studies investigating cardiovascular risk and outcomes in women who had experienced IPV, for which the authors claimed minimal research had been undertaken. The review identified 19 studies of various designs published between 1998 and 2019, including six that were also included in Stubbs and Szoeke (2021). Although the limited number of studies showed a mixed relationship between IPV and cardiovascular disease (CVD), the authors found that women who experienced IPV were more likely to have higher levels of CVD biomarkers, experience cardiovascular symptoms, and exhibit long-term cardiovascular complications compared with women unexposed to IPV (Liu et al., 2020). The review also found that research on associations between IPV, hypertension, and diabetes has insofar produced mixed results (Liu et al., 2020). From the literature, Liu at el. (2020) identified two potential pathways from IPV exposure to cardiovascular conditions: in one pathway, chronic stress alters physiological, biochemical and endocrine functions triggering immune-inflammatory responses in CVD-related biomarkers. The second suggested pathway is through greater uptake of health-risk behaviours; the authors found that smoking and alcohol use were both more prevalent among IPV exposed women, though physical inactivity was not found to have an association with IPV (Liu et al., 2020).

The authors attributed the mixed findings to differing sample sizes, sociodemographic sample profiles, and varying IPV and cardiovascular measurements used in studies (Liu et al., 2020). Studies predominantly focused on physical and sexual IPV and variably used 12-month and lifetime IPV measures, and while most used validated questionnaires, others relied on single measure self-reports which rendered it difficult to compare effects of IPV between studies (Liu et al., 2020). Liu et al. (2020) noted that future research should include different IPV types, severity, and chronicity in IPV

measurements, in order to explore how varying IPV factors impact cardiovascular outcomes. The search and reporting processes stringently followed the PRISMA reporting guidelines, and the review highlighted the importance of multiple risk factor approaches to understanding pathways to cardiovascular outcomes in this emerging research area.

The systematic review by Patton et al. (2021) focused on longitudinal studies that explored mental and physical health changes following an abusive relationship, in order to synthesise pathways to recovery after IPV experience. The 36 studies from 20 samples were published between 1995 to 2018, and included studies on women that had recently left or expected to soon leave an abusive relationship (i.e., at a shelter), and then assessed health indicators at multiple time points (Patton et al., 2021). Overall, Patton et al. (2021) found that depression, PTSD symptoms, and physical symptoms (e.g., pain, somatisation, fatigue) decreased over time after exiting an abusive relationship, and quality of life increased in most studies. Physical symptoms were explored in only nine studies from five samples; four unique studies explored physical health changes over time, of which three found significant decreases in physical symptoms (Patton et al., 2021). Ongoing IPV was found to be consistently associated with worse health outcomes, and social support was consistently predictive of improved health over time (Patton et al., 2021).

The authors acknowledged that the primary type of IPV could not be discerned in most studies (89%), which means it was not possible to compare the long-term recoveries from different types, though there were indications that outcomes differed between types (Patton et al., 2021). The review's inclusion criteria, requiring that studies identified women leaving or soon to leave abusive relationships, likely underestimated the impacts of severe, ongoing and long-term IPV, especially for women who do not attempt to leave. The authors noted that most of the studies reviewed focused on women aged in their 30s, however IPV is also prevalent for midlife and older women. The review followed the PRISMA reporting protocol, presenting a range of detailed evidence factors including demographic characteristics of included studies, sample settings, study design and follow-up characteristics, IPV factors, and risk of bias assessments.

2.4. Implications of the Existing Literature Reviews

As an introduction to research exploring the association between IPV exposure and physical health outcomes to-date, this evaluation of existing literature reviews has implications for the present structured literature review. Notably, the proliferation of research on IPV exposure and health

outcomes in the past two decades has enabled more focused and nuanced research into specific physical health outcomes to develop. These existing literature reviews confirm that substantial research has been undertaken into mental health and pregnancy-related outcomes, and health risk behaviours related to STIs. Thus, in order to retain a logical and manageable scope, the present structured literature review will focus on physical health outcomes and excludes communicable health outcomes.

While identifying a comprehensive list of recent publications on IPV and physical health outcomes, Stubbs and Szoeke (2021) did not sufficiently report on a range of evidence or quality factors for individual or pooled studies; expanded analysis of these included studies would greatly enhance understanding of the state of field. Importantly, several literature reviews emphasised that research should consider the physical health impacts of different types of IPV, IPV severity, and multiple types of IPV. Reviewers also emphasised that differential categorisations of IPV are prevalent, and should necessitate caution in making comparisons between findings. It can also be observed that use of population-based and representative samples is crucial for accurately assessing IPV prevalence and physical health outcomes.

Chapter 3. Methods for the Structured Literature Review

3.1. Introduction

This chapter outlines the methods used for the present structured literature review, including search and data collection methods used, which heavily utilise the PRISMA guidelines for reporting in systematic reviews (Page et al., 2021). Given its limited resources (such as one reviewer), this literature review draws similarities to 'systematized reviews' as outlined by Grant & Booth (2009). Further, it departs from typical systematic review frameworks in that it implements a two-pronged structure. Stubbs and Szoeke's (2021) systematic literature review was considered the primary reference for this thesis' structured review, given its recent publication and comprehensive inclusion of studies published within the past decade. However, the present structured literature review incorporates an expanded analysis of a relevant selection (detailed below) of studies included in Stubbs and Szoeke (2021) review by tabulating and critically re-appraising individual study findings, in order to better align with reporting standards for systematic reviews and to facilitate a more detailed understanding of the literature related to IPV exposure and physical health consequences. The second prong of the present structured review comprises an updated systematic literature search, to identify and assess any pertinent studies published since the end of Stubbs and Szoeke's catchment period in May 2019 to the time this thesis commenced. The results and discussion chapters of this structured review synthesise both the findings from the selected studies from Stubbs and Szoeke (2021) and the studies identified in the updated systematic review, in order to facilitate a comprehensive analysis of relevant publications from the past decade.

3.2. Objectives of the Structured Literature Review

Objective 1: To review the published literature to determine what is currently known about the associations between women's exposure to intimate partner violence and non-communicable physical health outcomes.

Objective 1a: to identify and critically assess the exposure measures and confounding variables that are commonly used in the analysis of associations between IPV and physical health outcomes.

3.3. Eligibility Criteria

The updated systematic literature review largely followed the eligibility criteria used by Stubbs and Szoeke (2021). In doing so, it provides a logical continuation of both Dillon et al. (2013) and Stubbs

and Szoeke (2021), which respectively covered publications from 2006-2012 and 2012-2019. The lower age limit of IPV exposure was reduced from 16 to 15 in order to align with the WHO MCS age range, however this did not affect the results of the review.

3.3.1. Inclusion criteria

The review included peer-reviewed observational studies that met all of the following criteria, adapted from Stubbs and Szoeke (2021):

1. Research must be an original study, not a review or protocol.
2. Studies must have been published between May 2019 and April 2021.
3. Results must concern women only, or women's results must be reported separately to men.
4. The study must include a group unexposed to IPV, to ascertain IPV as a risk factor.
5. The study must evaluate non-communicable physical health outcomes of IPV.
6. IPV must have occurred as an adult (over 15 years old).
7. Only studies available in English were included due to lack of funding to support translation of non-English studies.

3.3.2. Duration

Any study duration was eligible for inclusion.

3.3.3. Exclusion criteria

Studies were excluded if they met any of the following criteria:

1. Exclusively reported on mental health outcomes (with no or insufficient reporting of physical health outcomes), obstetric health, acute physical health outcomes (such as injuries or traumatic brain injury), infectious diseases, adverse childhood events or childhood exposure to IPV.
2. Study was interventional.
3. Focused on clinician care or screening of IPV.

3.4. Information Sources

The reference list provided in Stubbs and Szoeke (2021) was the primary information source for the expanded analysis component.

For the updated systematic review, three major databases (EBSCOhost, PubMed, Scopus) were searched using keywords and Boolean tools, with additional manual searching through relevant reference lists.

3.5. Search Strategy for Updated Systematic Review

"Intimate partner violence", "domestic violence", and "spouse abuse" were jointly searched as the keywords for IPV, as all three terms are utilised as Medical Subject Headings (MeSH) codes, and to ensure that literature was not excluded due to differing terminology.

In addition to searching with the general term "health" (as done by Stubbs and Szoeke), the literature search for this study was also run using keywords from the relevant high-level health outcome categories (cardiovascular, endocrine, neurological, chronic, healthcare utilisation) used to present studies in Stubbs and Szoeke (2021), to ensure that studies which exclusively utilised specific health issue terms were not excluded. Keywords associated with healthcare utilisation (which can be employed as a proxy for understanding physical health status) were included in the search strategy to better capture service use, rather than "screening" for clinician screening for IPV as has been used in previous reviews. MeSH codes were also referred to for each health outcome category to ensure appropriate capture of relevant conditions. "Chronic" was used as a term to ensure broad catchment of long-term health outcomes. Substance abuse was not specifically searched for in the updated systematic search, with the intention of only including publications that situated substance use on the causal pathway to other physical health outcomes.

Keyword searches were conducted within article keywords, titles, and abstracts where applicable. Date limits were set, covering literature published during the period of May 2019 to the time of the search in April 2021. Email alerts were set up for new publications for these search queries. New publications since April 2021 were not included in the updated systematic literature review, but informed the discussion of the structured literature review and discussion in Chapter 8.

The baseline search query was:

"intimate partner violence" OR "domestic violence" OR "spouse abuse" OR "domestic abuse"
AND "physical health" OR "cardiovascular" OR "neurolog" OR "endocrin*"*
OR "chronic" OR "healthcare utili?ation"

The full search strategy is located in Appendix 1.

3.6. Selection Process

3.6.1 Selection process for expanded analysis of studies in Stubbs and Szoeke (2021)

After filtering for relevance, 36 of the 52 studies included in Stubbs and Szoeke's (2021) reference list were selected for further examination. The decision was made to exclude studies which exclusively focused on infectious diseases (n=12), predominantly HIV and STIs, to retain relevance to the research focus on non-communicable health outcomes. Two studies listed in the publication's summary table (Ferreira, Shi) were not discussed elsewhere in the review or noted in the reference list, so could not be explored further. Two studies were excluded from the expanded analysis as they did not meet the inclusion criteria for the secondary analysis undertaken by BM; for one the results were insufficiently stratified or reported separately by gender, though it was reported that gender did not moderate the association between lifetime IPV and general health or quality of life (Wathen et al., 2018). In another, the study did not clearly include a non-abused group to enable assessment of IPV as a risk factor (Cesario et al., 2014). Studies that explored substance use outcomes were retained to assist with explanatory context for other studies, as substance use likely sits on the causal pathway between IPV and physical health outcomes (e.g., smoking and CVDs).

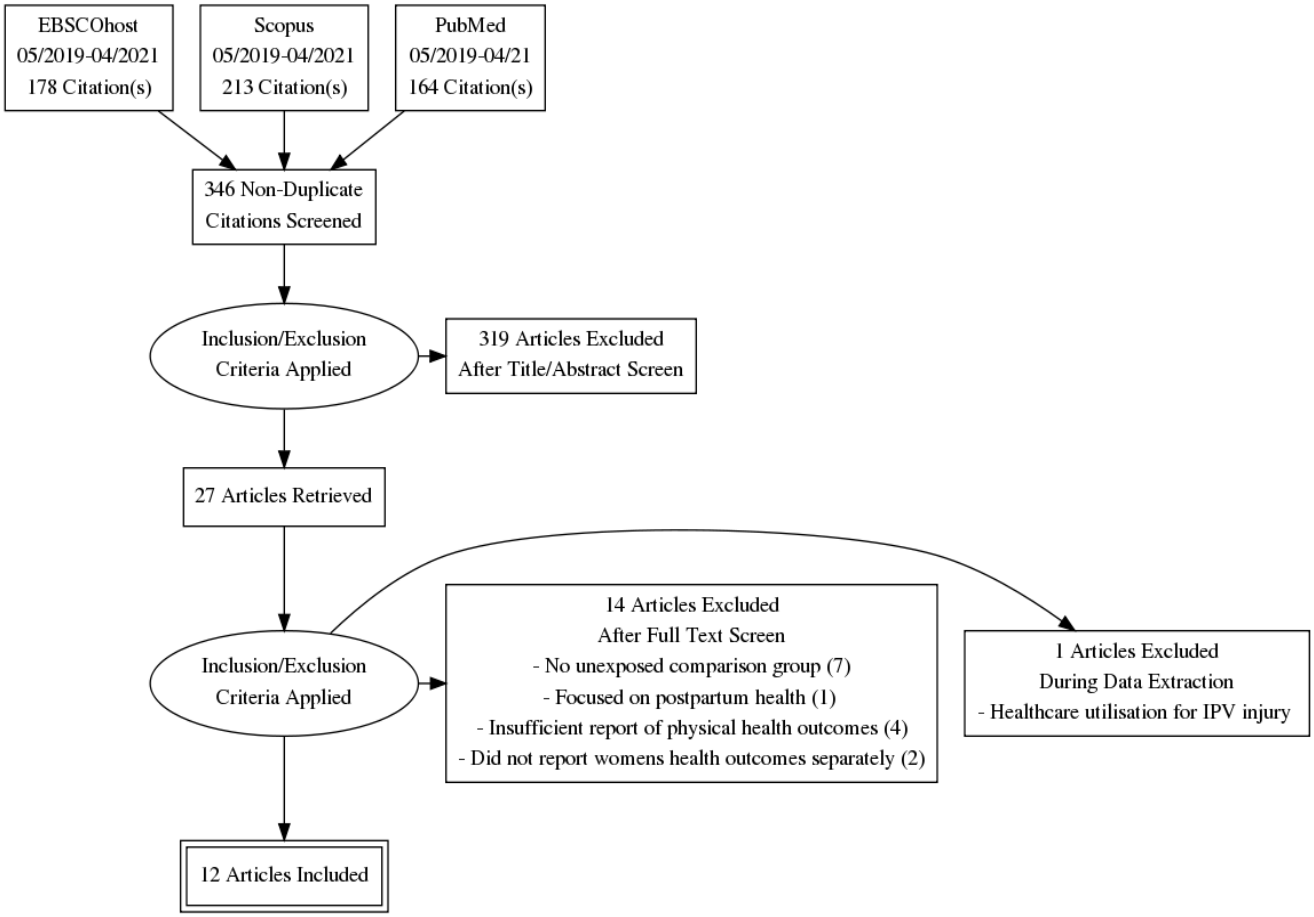
3.6.2. Selection process for updated systematic review

The search yielded 178 hits in EBSCOhost, 213 in Scopus, and 164 in PubMed. Full citations of all retrieved studies were downloaded into Microsoft Excel for review, and de-duplicated manually using title alphabetisation. This resulted in a total of 346 publications after removal of 209 duplicates. Titles and abstracts of these 346 studies were individually reviewed by BM, and 319 were removed as they were clearly irrelevant or met exclusion criteria. The full text of the remaining 27 articles were thoroughly scrutinised by BM, and 14 were excluded when selection criteria were applied: no unexposed comparison group (n=7), focused on immediate postpartum health (n=1), only reported mental health outcomes or insufficiently reported physical health outcomes (n=4), did not report women's health outcomes separately from men's (n=2). One further article was excluded during data extraction, as healthcare utilisation was only reported in response to IPV injury (Santas et al., 2020). One study which focused on IPV in the postpartum period was included as the health impacts measured were general, rather than specific to postpartum health issues (Brown et al., 2020). Studies which employed samples with specific health conditions or trauma-related backgrounds were retained for

consistency with Stubbs and Szoeke (2021), though limitations of these samples were noted. Where uncertainties arose, studies were brought to JF, VS and LH and discussed.

Twelve studies were included in the updated systematic review. They were obtained from EBSCO (n=4), Scopus (n=5), PubMed (n=3). Figure 3.1 illustrates the full study selection strategy for the updated systematic review.

Figure 3.1.
PRISMA Flow Diagram of Study Identification and Selection



Note. Adapted from Page et al. (2021).

3.7. Data Collection Process

Data was extracted from each study for both the expanded analysis of selected studies (n=36) included in Stubbs and Szoeke (2021) and the updated systematic review (n=12) by BM. Data extraction used a template adapted from Cochrane's data collection form for RCTs and non-RCTs, further informed

by the Cochrane Handbook for Systematic Reviews of Interventions (Higgins et al., 2021). A copy of the data extraction form is located in Appendix 2.

3.8. Data Items and Presentation of Results

Due to the heterogeneity of analytic methods and outcomes in the included studies, a meta-analysis was not possible. Therefore, results for the expanded analysis of studies included in Stubbs and Szoeke (2021) and updated systematic review were summarised in separate tables by the data extraction categories, and described together through narrative synthesis. Extracted information on study characteristics is presented in Tables 4.1 and 4.2 in Chapter 4 by the categories: first author and year, aim/objectives, sample size, participant characteristics, country, sample setting/target population, and study design. As applicable and where reported, participant characteristics included were: mean age, age range, IPV prevalence or number of cases and controls. Tables 4.3 and 4.4 in Chapter 4 present the IPV measures, control/covariates, outcome measures, key findings, and limitations of the studies. 95% confidence intervals were presented in square brackets where reported. Where specific IPV measurement tools were not reported in the study publication, attempts were made to locate these in survey questionnaires or methods elsewhere.

3.9. Study Risk of Bias Assessment

Limitations were explored in lieu of a risk of bias assessment of individual studies, primarily to retain manageability given the scope of the review. Risk of bias across studies will be explored in Chapter 5.

Chapter 4. Results of the Structured Literature Review

4.1. Sample Characteristics and Study Design of Included Studies

Of the 48 total studies (presented in Tables 4.1 and 4.2), most were conducted in the United States (n=28), followed by the UK (n=4), and Australia (n=2). The remainder were from a broad range of high income, or low- and middle-income countries, including Saudi Arabia, Kenya, Turkey, Canada, Germany, India, Jordan, and Spain. One study had an international sample, which included data from ten countries (Potter et al., 2021). The primary sample settings were population-based (26/48), followed by studies which sampled participants from healthcare settings (16/48). Other sample settings included those taking part in a drinking during pregnancy programme (Roos et al., 2017), a nurses cohort study (Mason et al., 2012; Mason et al., 2013), and studies conducted for site-specific prevalence and outcome data, such as informal settlements in Kenya (Winter et al., 2020).

Over half (n=31) of the 48 included studies employed a cross-sectional study design, including one prospective cross-sectional study. No longitudinal studies were included in the updated systematic review component; five studies (of four samples) in Stubbs and Szoeke were longitudinal. Sample sizes varied widely depending on data collection methods. The median sample size for studies that gathered data using survey methods (including cross-sectional and cohort studies) (n=35) was 3,222 [Q1:640 - Q3:10,264]. The largest sample sizes primarily mined national electronic health record datasets. The sample sizes for the six studies that mined two databases ranged from 67,625 to 14,321,010 (Chandan et al., 2021; 2019; 2020; 2019; Karakurt et al., 2017; Whiting et al., 2017). Four of the 48 publications explored different physical health outcomes of the same retrospective cohort utilising UK-based electronic health records (Chandan et al., 2021; 2019; 2020; 2019). Sample sizes were smaller in studies that utilised biological samples or measurements. This is likely due to cost factors, as identified in Liu et al. (2020). The median sample size for studies that used clinical or biological data collection methods (n=6) was 95 [Q1:37 - Q3:122].

Due to missing data in numerous studies, the mean age of participants across the study samples cannot be reported. Overall, it can be observed that most studies included women between 18 and ~50 years old, with few studies capturing women in older age groups. IPV prevalence varied widely across studies, primarily due to sample settings. For example, IPV was recorded in 0.04% of electronic health records (Karakurt et al., 2017), compared with 38.3% from a population-based sample (Coker et al., 2019), and 85.9% of women at a Veterans Affairs medical centre (Dichter et al., 2014).

Table 4.1.
Summary of Study Characteristics: Expanded Analysis of Studies Included in Stubbs and Szoeke (2021)

First author, year	Aim/objectives	Sample size	Participant characteristics	Country	Sample setting/ target population	Study design
Al-Modallal, 2016	Identify significant associations between IPV exposure types and physical health problems	238	*Age range:* 17-66 *Mean age:* 32.7 *Physical IPV prev:* 22.7% *Sexual IPV prev:* 16.7% *Psychological IPV prev:* 11.1%	Jordan	Palestinian Refugee Healthcare Centres	Cross-sectional
Basu, 2013	Examine how mental health disorders in the context of IPV and chronic trauma exposure are associated with basal and diurnal salivary cortisol levels	88	*Age range:* 18.7-41.9 *Mean age:* 27 *Diagnostic groups (IPV exposed):* PTSD n=14, PTSD/comorbid MDD n=43, PTSD/MDD symptoms n=19 *Matched controls (No IPV or mental health disorders):* n=12	US	Community and local domestic violence shelter	Case-control
Bosch, 2017	Describe the prevalence of IPV and examine associations of IPV exposure with multiple domains of health	3,110	*Age range:* 18-89 *Mean age:* NR *IPV prev:* 25%	US	Population-based	Cross-sectional
Brown, 2013	Determine the association between IPV exposure and preventive screening for HIV, cholesterol, and cervical, colorectal, and breast cancers	30,182	*Age range:* 18-NR *Mean age:* NR *IPV prev:* 25%	US	Population-based	Cross-sectional

First author, year	Aim/objectives	Sample size	Participant characteristics	Country	Sample setting/ target population	Study design
Campbell, 2018	Examine the prevalence of and associations between probable traumatic brain injury and central nervous system symptoms	901	*Age range:* 18-55 *Median age:* 27 *IPV cases* n=543 *No IPV Controls* n=358	US	Healthcare waiting rooms Women of African descent	Case-control
Chandan, 2019	Assess the relationship between IPV exposure with the development of temporomandibular joint disorder	92,735	*Age range:* NR *Mean age:* 36.9 *IPV exposed* n=18547 *IPV unexposed* n=74188	UK	Population-based	Retrospective Cohort
Clark, 2014	Investigate sex differences in the relationship between IPV victimisation/perpetration and blood pressure outcomes	Women: 5,388	*Age range:* NR *Mean age (women):* 21.72 *IPV prev (women):* 46.9%	US	Population-based	Longitudinal Cohort
Coker, 2017	Determine the role of IPV timing and types on cancer-related quality of life, defined by women's functioning within the 12–18 months following a cancer diagnosis	3,278	*Age range:* 18-79 *Mean age:* NR *IPV prev*: 37.3% *Sexual IPV prev:* 10.6% *Physical IPV prev:* 24.5% *Psychological IPV prev:* 33.6%	US	Two state cancer registries	Cohort

First author, year	Aim/objectives	Sample size	Participant characteristics	Country	Sample setting/ target population	Study design
Dichter, 2014	Identify associations between psychological, physical, or sexual IPV exposure and health status and health risk behaviours	249	*Age range:* 22-64 *Mean age:* 46.6 *IPV prev:* 85.9% *Physical IPV prev:* 57% *Sexual IPV prev:* 35% *Psychological IPV prev:* 82%	US	Veteran Affairs medical centre Women veterans	Cross-sectional
Dutta, 2018	Examine individual and intimate partner factors (including IPV) associated with cervical cancer screening	3,222	*Age range:* 15-49 *Mean age (screened):* 33.8 *Mean age (not screened):* 37.8 *IPV prev (screened):* 31.9% *IPV prev (not screened):* 38.6%	Kenya	Population-based	Cross-sectional
Flanagan, 2016	Examine association and gender differences of IPV, PTSD, and alcohol use and their co-occurrence with cigarette smoking quantity	Women: 13,836	*Age range:* NR *Mean age (female smoker):* 41.0 *Mean age (female non-smoker):* 46.9 *IPV prev (women):* 14%	US	Population-based	Cross-sectional
Gerber, 2012	Estimate prevalence for PTSD and past year and lifetime physical IPV in treatment setting, and test associations between headache severity and PTSD and physical IPV	92	*Age range:* 18-66 *Mean age:* 39 *Recent IPV prev:* 9.8% *Lifetime IPV prev:* 36.9%	US	Women's Headache Centre	Cross-sectional

First author, year	Aim/objectives	Sample size	Participant characteristics	Country	Sample setting/ target population	Study design
Gibson, 2019	Examine the associations of IPV, sexual assault, and post-traumatic stress with menopause symptoms	2,016	*Age range:* 40-80 *Mean age:* 60.5 *Emotional IPV prev:* 21% *Physical IPV prev:* 15.7% *Sexual assault:* 18.9%	US	Kaiser Permanente healthcare system Midlife and older women	Cross-sectional
Halpern, 2017	Investigate the association between women's IPV exposure, in-vivo CVD measures, and inflammatory biomarkers as predictors for CVD	37	*Age range:* 19-63 years *Mean age:* NR *IPV prev:* 51%	US	Dental clinic	Cross-sectional
Humphreys, 2012	Examine association between IPV exposure and telomere length in peripheral blood mononuclear cells	102	*Age range:* 18-54 *Mean age:* 32.1 *IPV exposed* n=66 *IPV unexposed* n=46	US	Population-based	Cross-sectional
Kamimura, 2014	Examine the prevalence of IPV with physical and mental health indicators	Women: 134	*Age range:* 18-64 *Mean age (women US-born):* 44.9 *Mean age (women non-US born):* 43.3 *Lifetime IPV prev (women):* 44% *Current IPV prev (women):* 13%	US	Free clinic patients	Cross-sectional
Karakurt, 2017	Identify women's health issues that are potentially associated with IPV exposure by mining de-identified and aggregated electronic health record data	14,321,010	*Age range:* 18-65 years *Mean age:* NR *IPV prev:* 0.04%	US	Population-based	Cross-sectional

First author, year	Aim/objectives	Sample size	Participant characteristics	Country	Sample setting/ target population	Study design
Kim, 2015	Examine association between physical IPV exposure and diurnal patterns of salivary cortisol	Women: 122	*Age range:* 30-40 years *Mean age (women):* 34 *Psychological IPV prev (women):* 86% *Physical IPV prev (women):* 11%	US	Couples in their 30s of lower socioeconomic status	Cohort
Lacey, 2015	Evaluate the association between IPV and mental and physical health status	NR	*Age range:* 34-49 *Mean age:* NR *IPV prev (full sample):* 8.3%	US	Population-based US Caribbean Black and African American women	Cross-sectional
Lacey, 2016	Examine the association between exposure to severe physical IPV and mental and physical health, and explore the role of generational status	949	*Age range:* 18-NR *Mean age:* NR *IPV prev:* 11.9%	US	Population-based US Caribbean Black women	Cross-sectional
Loxton, 2017	Determine the impact of IPV on women's mental and physical health over a 16 year period and across three generations	16,761	*Age range:* NR (cohort) *Mean age:* NR (cohort) *IPV prev:* 5-26%	Australia	Population-based	Longitudinal cohort
Mason, 2012	Estimate the association between women's IPV exposure and the development of hypertension	51,434	*Age range:* NR (cohort) *Mean age:* NR *Physical IPV prev:* 22% *Sexual IPV prev:* 10% *Severe emotional IPV prev:* 1.5%	US	Nurses	Longitudinal cohort

First author, year	Aim/objectives	Sample size	Participant characteristics	Country	Sample setting/ target population	Study design
Mason, 2013	Estimate the association between women's IPV exposure and the development of type 2 diabetes	64,732	*Age range:* NR (cohort) *Mean age:* NR *Physical IPV prev:* 22% *Sexual IPV prev:* 10% *Severe emotional IPV prev:* ~2%	US	Nurses	Longitudinal cohort
Mason, 2017	Examine the association between IPV exposure and 5-year weight gain in young women, and the role of depressive mood in weight gain	619	*Age range:* NR *Mean age:* 20.3 *IPV prev:* 20%	US	Population-based	Longitudinal cohort
Mathew, 2013	Explore the association between IPV exposure and health status, chronic disease, and preventive screening behaviours	832	*Age range:* 18-65 *Mean age:* 39 *IPV prev:* 18.4%	US	Emergency department	Cross-sectional
McCloskey, 2017	Determine whether childhood sexual abuse and IPV are associated with women's voluntary sterilisation when adjusting for demographics and reproductive health history	278	*Age range:* 18-59 *Mean age:* 32.8 *IPV prev:* ~50%	US	Clinic outpatients	Cross-sectional
Montero, 2013	Estimate the prevalence of lifetime IPV in older women and analyse the effect of IPV on women's health and healthcare service utilisation	1,676	*Age range:* 55-70 *Mean age:* NR *IPV prev:* 29.4%	Spain	Primary Healthcare Services	Cross-sectional

First author, year	Aim/objectives	Sample size	Participant characteristics	Country	Sample setting/ target population	Study design
Prosman, 2012	Investigate the association between IPV exposure and healthcare utilisation	100	*Age range:* 18-NR *Mean age:* NR *IPV exposed cases* n=50 *No IPV controls* n=50	Netherlands	16 general practice clinics in deprived areas	Case-control
Rafael, 2017	Assess the association between severe IPV exposure and inadequate screening of uterine cervical cancer	640	*Age range:* 25-64 *Mean age:* 44.0 *IPV prev:* 5.8%	Brazil	Women enrolled in Family Health Strategy	Case-control
Roos, 2017	Quantify underlying structural connectivity in IPV exposed women without PTSD and controls using Graph Theory Analysis	36	*Age range:* 16-38 *Mean age (cases):* 23.3 *Mean age (controls):* 27.4 *IPV exposed cases* n=18 *IPV unexposed controls* n=18	South Africa	Program for drinking behaviour in pregnancy	Case-Control
Stene, 2013	Investigate the association between women's lifetime exposure to IPV (physical and/or sexual IPV or psychological IPV alone) and cardiovascular risk and drug treatment	5,593	*Age range:* 30-60 *Mean age:* NR *IPV prev:* 13.4%	Norway	Population-based	Prospective cross-sectional
Stöckl, 2015	Investigate the prevalence of IPV in its different types and its association with physical and mental health symptoms of older women, compared with women of reproductive age	10,264	*Age range:* 16-86 *Mean age:* NR *Controlling behaviours prev:* 28%-33% *Economic IPV prev:* 13%-17%	Germany	Population-based	Cross-sectional

First author, year	Aim/objectives	Sample size	Participant characteristics	Country	Sample setting/ target population	Study design
Whiting, 2017	Identify associations between IPV and women's health issues by mining aggregated de-identified electronic health record data and comparing health issues of IPV versus non-IPV records	14,321,010	*Age range:* 18-65 *Mean age:* NR *IPV+ records:* 5870	US	Population-based	Cross-sectional
Winter, 2013	Assess the association of 3 types of IPV (verbal, physical, and sexual) with self-reported symptoms of reproductive tract infections	65,610	*Age range:* 15-49 *Mean age:* 32 *IPV prev:* 23.9% *Verbal IPV prev:* 10.1% *Physical IPV prev:* 19.1% *Sexual IPV prev:* 6.0%	India	Population-based	Cross-sectional
Wright, 2021 (2018)	Examine the association between past-year IPV exposure and 30-year CVD risk score	7,392	*Age range:* 24-32 *Mean age:* 29 *Past year IPV prev:* 15%	US	Population-based	Cross-sectional
Wright, 2019	Examine potential mediators, including depressive symptoms, perceived stress, and alcohol dependence, on the relationship between IPV and CVD risk	7,392	*Age range:* 24-32 *Mean age:* 29 *Past year IPV prev*: 15%	US	Population-based	Cross-sectional

Note. Participant characteristics are presented as reported in study; sub-categories are included where full sample characteristics were not reported. All ages are provided in years.

BRFSS = Behavioural Risk Factor Surveillance System; CVD = Cardiovascular disease; MDD = Major depressive disorder; prev = prevalence; PTSD = Post-traumatic stress disorder; NR = Not reported; UK = United Kingdom; US = United States

Table 4.2.
Summary of Study Characteristics: Updated Systematic Literature Review (May 2019 - April 2021)

First author, year	Aim/objectives	Sample size	Participant characteristics	Country	Sample setting/ target population	Study design
Alhalal, 2020	Assess the association between IPV severity and resilience and hair cortisol concentrations	156	*Age range:* 17-53 *Mean age:* 32.2 *Past year IPV prev:* 63.5%	Saudi Arabia	Healthcare settings	Cross-sectional
Brown, 2020	Investigate mental and physical health of mothers exposed to recent and early postpartum IPV over 10 years	1,507	*Age range:* 18-50 *Mean age (at birth):* 30.9 *Any IPV prev:* 34.8% *Recent IPV prev:* 19.1%	Australia	First-time mothers Public maternity hospitals	Prospective cohort
Chandan, 2019	Investigate the association between IPV exposure with the functional syndromes fibromyalgia and chronic fatigue syndrome using 'The Health Improvement Network' (HIN) database	92,735	*Age range:* NR *Mean age:* 36.9 *IPV exposed* n=18547 *IPV unexposed* n=74188	UK	Population-based Health record database	Retrospective cohort
Chandan, 2020	Explore the relationship between IPV and cardiometabolic disease (CVD, hypertension, and T2DM) and mortality using the HIN database	90,778	*Age range:* NR *Mean age:* 36.9 *IPV exposed* n=18547 *IPV unexposed* n=72231	UK	Population-based Health record database	Retrospective cohort

First author, year	Aim/objectives	Sample size	Participant characteristics	Country	Sample setting/ target population	Study design
Chandan, 2021	Explore the association of IPV exposure with the development of chronic lower back pain, interstitial cystitis, vulvodynia, chronic headaches, myofascial pain syndrome, irritable bowel syndrome and restless legs syndrome, using the HIN database	67,625	*Age range:* NR *Mean age:* 36 years *IPV exposed* n=22604 *IPV unexposed* n=44671 *IPV prev*: 0.2%	UK	Population-based Health record database	Retrospective cohort
Coker, 2019	Assess whether violence (either recent or increasing number of violence types) increases the rate of poorer current HRQoL perceptions, and identify potential mediators that explain associations between violence and current HRQoL	12,594	*Age range*: 18-NR *Mean age:* NR *IPV prev:* 38.3%	US	Population-based	Cross-sectional
Hayes, 2020	Examine sex differences in associations between IPV exposure and self-rated physical and mental health	Women: 7,433	*Age range:* 18-NR *Mean age:* NR *IPV prev:* NR	US	Population-based	Cross-sectional
Makaroun, 2020	Examine the prevalence of IPV among older women and evaluate the associations of IPV exposure with health conditions and health service utilisation	4,481	*Age range:* 45-NR *Mean age:* NR *Age 45-59 IPV prev:* 8.7% *Age 60+ IPV prev:* 5.1%	US	Veterans' Health Administration clinics Women older than childbearing age	Cross-sectional
Nur, 2020	Identify the factors, including IPV, associated with HRQoL	1,236	*Age range:* 15-49 *Mean age:* NR *IPV prev:* 16.7%	Turkey	Population-based	Cross-sectional

First author, year	Aim/objectives	Sample size	Participant characteristics	Country	Sample setting/ target population	Study design
Potter, 2020	Explore the associations of different categories of IPV on women's mental and physical health	21,221	*Age range*: 15-49 *Mean age:* NR for full sample *Physical IPV prev:* 6.1% *Psychological IPV prev:* 7.0% *Sexual IPV prev:* 6.4%	Int'l (10 countries)	Population-based	Cross-sectional
Winter, 2020	Explore correlates, with focus on IPV, of women's physical health and mental health	361	*Age range:* 18-54 *Mean age:* NR *Past year IPV prev*: 66.2%	Kenya	Informal settlements	Cross-sectional
Yaya, 2019	Assess the predictors of IPV and its association with healthcare use	7,669	*Age range:* 15-49 *Mean age:* 27.65 *IPV prev:* 41.1%	Angola	Population-based	Cross-sectional

Note. Participant characteristics are presented as reported in study; sub-categories are included where full sample characteristics were not reported. All ages are provided in years.

CVD = Cardiovascular disease; HIN = Health Improvement Network; HRQoL = Health-related quality of life; Int'l = International; NR = Not reported; prev = prevalence; T2DM = Type 2 diabetes mellitus; UK = United Kingdom; US = United States

4.2. Associations Between Women's Exposure to IPV and Non-Communicable Physical Health Outcomes

To build on Stubbs and Szoeke's (2021) review without reproducing their findings, the following synthesis will briefly present the authors' conclusions per health category with tabulated study findings presented in Table 4.3. These conclusions will be augmented with findings from new studies identified in the updated systematic review, which are presented in Table 4.4. Findings on the association between women's exposure to IPV and physical health are presented below by the physical health categories: self-rated general physical health, cardiovascular outcomes, endocrine disorders, neurological disorders, central sensitivity syndromes, and healthcare utilisation.

4.2.1. Self-rated general physical health

Self-rated general physical health (often via the Global Self-Rated Health tool) is commonly utilised as an outcome measure, and it has been found that those with chronic diseases or disabilities are more likely to self-rate their physical health as poor compared with those without (Cott et al. 1999, cited in Al-Modallal, 2016). Stubbs and Szoeke (2021) found that exposure to IPV was associated with worse self-rated physical health in numerous studies (e.g. Al-Modallal, 2016; Dichter et al., 2014; Lacey et al., 2015; Loxton et al., 2017). Only one study reported finding no difference in self-rated health between IPV-exposed and unexposed groups (Kamimura et al., 2014).

In the updated systematic review, six of the twelve studies explored IPV and self-rated physical health. A large international study utilising data from ten countries found that relative to those not reporting a history of IPV, those exposed to all types of IPV (combined sexual, psychological and/or physical IPV) were almost twice as likely to report poor or very poor self-rated health, with an adjusted odds ratio (AOR) of 1.9 [1.62-2.22] (Potter et al., 2021). Experience of other types of IPV were associated with increased risk of poor or very poor self-rated health, including psychological IPV alone (AOR 1.5 [1.26-1.80]) and combined psychological and physical IPV (AOR 1.74 [1.46-2.09]) (Potter et al., 2021). In a study of women living in informal settlements in Kenya, exposure to physical IPV was associated with a lower odds ratio (OR) of having a normal/high self-rated physical health score (OR 0.36 [$p<0.001$]), though experience of sexual and psychological IPV were not significantly associated with self-reported poor health outcomes (Winter et al., 2020). Other studies measured general health using health-related quality of life (HRQoL), which conceptualises and evaluates multiple life dimensions, including health conditions and treatment, mental health, as well as socioeconomic aspects

of life quality (Nur, 2020). Nur et al. (2020) found that among married Turkish women, exposure to IPV was associated with worse physical HRQoL (AOR 1.71, 1.21-2.40).

An Australian prospective cohort study which examined IPV exposure based on recency, found that women recently exposed to IPV had worse health outcomes compared with both those who had previously experienced IPV and those who had never experienced IPV (Brown et al., 2020). However, exposure to past IPV was still associated with worse health outcomes, including an almost two-fold increased risk for self-reporting worse general health (AOR 1.8 [1.3-2.7]) compared with those who had never experienced IPV, suggesting poor health outcomes persist after IPV ceases (Brown et al., 2020).

This finding is supported by Coker et al. (2019), which observed that women exposed to current IPV had an adjusted prevalence rate ratio (APRR) of 3.34 [2.33-4.81] for reporting poorer physical HRQoL than those who reported no experience of violence, and that worse health outcomes also existed for those with past but not current IPV (APRR 2.14 [1.90-2.41]). This study gathered data and presented descriptive statistics on different IPV types (physical, sexual, stalking), but did not disaggregate the different IPV types in its analysis of polyvictimisation alongside sexual assault (including by non-partners) and childhood abuse. These studies support the contention that IPV victimisation is consistently associated with worse self-rated general health.

4.2.2. Cardiovascular outcomes

4.2.2.1. Cardiovascular diseases. Cardiovascular diseases (CVDs) include disorders of the heart and blood vessels, and are the leading cause of death globally (WHO, 2021a). Twelve studies in Stubbs and Szoeke (2021) explored the association between IPV and CVD and CVD risk factors, but varied widely in sample sizes and study designs. For example, Halpern et al. (2017) gathered salivary samples from women with IPV exposure to assess for CVD biomarkers, finding positive correlations between IPV exposure and inflammatory cardiovascular biomarkers, as well as chest pain ($p=0.01$) and heart palpitations ($p=0.02$). In others, cross-sectional data was used to measure CVD risk using the validated Framingham Risk Score for CVD, a clinical risk score based on age, sex, diabetes, smoking, systolic blood pressure, and total and high-density lipoprotein (HDL) cholesterol for those with no CVD at baseline (Wright et al., 2019, 2021). Wright et al. found a 1% increased 30-year CVD risk for those with past year IPV exposure, which became insignificant when adjusted for demographic and other predictor variables in the multivariate model, though in a further study the association between IPV and 30-year CVD risk score remained significant after controlling for depressive symptoms as a

mediating factor (Wright et al., 2019, 2021). Two studies also found that obesity, a CVD risk factor, was associated with IPV exposure (Bosch et al., 2017; Stene et al., 2013).

In the updated systematic review, two studies explored the association between IPV exposure and CVDs. Using a large healthcare database, Chandan et al. (2020) found that exposure to IPV was associated with an increased adjusted incidence rate ratio (AIRR) of 1.31 [1.11–1.55] for cardiovascular diseases: ischaemic heart disease had the greatest increased risk (AIRR 1.40 [1.09-1.79]), followed by stroke/transient ischaemic attack (AIRR 1.29 [1.02-1.63]). Exploring the suggestion that IPV exposure may be linked with increased risk for CVDs through high-risk lifestyle behaviours (such as smoking and alcohol abuse), Chandan et al. (2020) found that the associations between IPV and CVD persisted after control matching and adjusting for the high rates of smoking and excess alcohol use in their sample, thus indicating that the causal pathways between IPV exposure and CVD may exist beyond these factors. In another study, women who had experienced past IPV reported higher odds (AOR 2.1 [1.1-4.0]) of heart disease, hypertension, and diabetes than those reporting recent experience of IPV (AOR 1.3 [0.7-2.7], when compared with women who had not experienced any IPV (Brown et al., 2020).

4.2.2.2. Hypertension. Hypertension (high blood pressure) is a primary risk factor for nearly all types of CVD (Liu et al., 2020). Stubbs and Szoeke (2021) found considerable discrepancies across seven studies that explored the association between IPV and hypertension, and attributed these conflicting findings to differences in sample populations and sizes, IPV definitions and study designs (Al-Modallal, 2016; Bosch et al., 2017; Clark et al., 2014; Halpern et al., 2017; Lacey & Mouzon, 2016; Mason et al., 2012; Stene et al., 2013).

The three additional studies exploring hypertension in the updated systematic review found no association between IPV exposure and increased risk of hypertension. Risk of hypertension was not increased by IPV exposure (AIRR 0.99 [0.88–1.12]) in an analysis of healthcare records by Chandan et al. (2020), though this study's reliance on identifying clinical codes for exposure and outcomes likely significantly underestimated prevalence of both IPV and hypertension. Makaroun et al. (2020) found a slight increase in odds of hypertension (AOR 1.20, [0.90-1.60]) among IPV exposed middle-aged veterans, however this association was not significant. As presented earlier, Brown et al.'s (2020) analysis found that exposure to any IPV increased risk for combined CVD, diabetes, and hypertension (AOR 1.7 [1.0-2.9]), though it is not possible to infer results for hypertension specifically.

Thus, the finding of the studies included in the updated systematic review concurs with the inconsistencies for CVD outcomes and risk factors identified by Stubbs and Szoeke (2021). Given the heterogeneity of sample settings, study designs, and methods (including IPV definitions) used to study the association between IPV and CVD and CVD risk factors, it is difficult to draw definitive conclusions on the associations in the literature. However, the significantly increased risk found in some studies indicates that more work needs to be done in this area using comparable methods.

4.2.3. Endocrine disorders

4.2.3.1. Type 2 diabetes mellitus. Four studies included in Stubbs and Szoeke (2021) explored the link between IPV exposure and type 2 diabetes mellitus (also a prime risk factor for CVD), and presented different findings. However, the authors contended that two studies (Al-Modallal, 2016; Mason et al., 2013) suggested that an association is plausible, and recommended that future population-based studies should further classify and analyse associations by IPV types (Stubbs & Szoeke, 2021). For example, Mason et al. (2013) reported an adjusted hazard ratio (AHR) of 1.61 [1.09-2.38] for women exposed to severe psychological abuse having a diabetes diagnosis, after adjusting for BMI and other diabetes risk factors.

One study in the updated systematic review used primary care records to identify women's IPV exposure, finding type 2 diabetes was increased at AIRR 1.51 [1.30–1.76] for women whose primary care records reported exposure to IPV (Chandan et al., 2020). The limitations of these electronic database studies are described elsewhere, however the significant association found between IPV and type 2 diabetes within this large, nationally representative database supports other findings and strengthens the possibility of a true association.

4.2.3.2. Cortisol dysregulation. Hypothalamic-pituitary-adrenal (HPA) axis function is a key mechanism in the physiological pathways of stress. As cortisol is an anti-inflammatory hormone, cortisol dysregulation may increase inflammation and related metabolic and autoimmune disorders, including chronic pain, asthma, and obesity (Alhalal & Falatah, 2020). Two studies in Stubbs and Szoeke (2021) explored associations between IPV and cortisol levels, which presented different findings (Basu et al., 2013; Kim et al., 2014). In Kim (2014), IPV was associated with lower cortisol levels (including lower cortisol awakening response, and higher midday cortisol) and physical IPV (but not psychological IPV) was associated with cortisol dysregulation. Stubbs and Szoeke recognised that both studies were limited by small sample sizes (n=88, n=122, respectively) (Basu et al., 2013; Kim et al., 2014). It can be further observed that the study by Basu et al. (2013) was limited in that it

only measured exposure to severe physical IPV and primarily focused on mental health pathways between IPV and cortisol levels (via comparison of mental health condition symptom severity and diagnostic groups), and therefore could not compare cortisol levels with women who experienced IPV but who did not meet criteria for the included mental health categories.

One study in the updated systematic review explored cortisol dysregulation. Alhalal et al. (2020) found a significant difference in hair cortisol levels between IPV exposed and unexposed women in Saudi Arabia. Additionally, exposure to greater IPV severity predicted lower hair cortisol concentrations, after adjustment for PTSD and depressive symptoms (Alhalal & Falatah, 2020). Although this study used a combined measure for IPV types, it had a slightly larger sample size (n=156) which helps to strengthen the findings reported by Basu et al. (2013) and Kim et al. (2014). As identified in Yim & Kofman (2019), cortisol is currently the primary measure used in endocrine studies, and has insofar produced consistent results pertaining to associations between women's exposure to IPV and cortisol dysregulation.

4.2.4. Central sensitivity syndromes and chronic pain

Stubbs and Szoeke (2021) identified three studies that assessed chronic pain, which all reported increased risk of reporting pain or use of pain medication among women who had experienced IPV, details of which are outlined in Tables 4.1 and 4.3 (Al-Modallal, 2016; Loxton et al., 2017; Montero et al., 2013). Stubbs and Szoeke (2021) undertook additional analysis on one study, in which 51.6% of women who had experienced any IPV had been diagnosed with fibromyalgia compared with 23.9% of unexposed women, and reported that exposure to psychological IPV had a significantly stronger association with fibromyalgia than other IPV types (p= 0.007) (Al-Modallal, 2016). However, Stubbs and Szoeke (2021) noted that this study was limited by its small sample size and marginalised population of refugee women. Use of this sample population could result in overestimation the prevalence of both IPV experience and worse health outcomes among already disadvantaged women, thus overestimating the associations found.

In the updated systematic review, two studies directly explored chronic pain disorders; the development of which has been partially attributed to sensitisation of the central nervous system, thought to also be caused by dysregulation of the HPA axis (Chandan et al., 2021). In the first study to explore the association between IPV and central sensitivity syndromes (CSS), associations were observed between IPV exposure and CSS, including: chronic lower back pain (AIRR 2.28 [1.85–2.80]), chronic headaches (AIRR 3.15 [1.07–9.23]), irritable bowel syndrome (AIRR 1.41 [1.25–1.60])

and restless legs syndrome (AIRR 1.89 [1.44–2.48]) (Chandan et al., 2021). Using the same dataset, Chandan et al. (2019) explored the relationship between IPV exposure and the functional syndromes fibromyalgia and chronic fatigue syndrome, which are hypothesised to be caused by cortisol imbalances. This study found that IPV exposed women developed fibromyalgia at an AIRR 1.73 [1.36-2.22] and chronic fatigue syndrome at AIRR 1.92 [1.11-3.33] compared with unexposed women (Chandan, Thomas, Raza, et al., 2019). Another study found that relative to those who did not report a history of IPV, women who experienced combined physical, sexual, and psychological IPV were almost twice (AOR 1.87 [1.69-2.07]) as likely to report recent pain or discomfort, which may be related to chronic pain (Potter et al., 2021). In general, it appears studies on the relationship between experience of IPV and chronic pain disorders produce consistent associations.

4.2.5. Neurological disorders

Stubbs and Szoeke (2021) noted that traumatic brain injury (TBI) is a key consideration that needs to be taken into account in exploring associations between IPV exposure and neurological conditions, however acute impacts of IPV were mostly out of scope for the review criteria. One study in their review found that probable TBI was found in an estimated 50% of IPV exposed women in its sample, and that 60% of IPV exposed women experienced dizziness compared with 37% non-exposed women (Campbell et al., 2018). However, Stubbs & Szoeke (2021) highlighted that 75% of women who experienced psychological IPV in Al-Modallal (2016) reported recurrent dizziness, compared with 48.7% of women who had not experienced psychological IPV, and thus suggested that dizziness cannot be wholly attributable to physical IPV and related TBI.

One study in the updated systematic review explored associations between experience of IPV and neurological symptoms (Potter et al., 2021). While exposure to all types of IPV posed increased risk of reporting possible neurological symptoms, the greatest risk was observed for women who experienced combined physical, sexual, and psychological IPV, who were twice as likely to report experiencing dizziness (AOR 1.99 [1.82-2.19]) and memory or concentration issues (AOR 2.30 [2.05-2.59]) in the 4 weeks prior to the survey (Potter et al., 2021). Overall, neurological disorders remain underexplored in the literature; the updated systematic review likely also excluded neurological studies that directly related to acute injuries such as TBI by design.

4.2.6. Other chronic diseases

Across numerous studies in Stubbs and Szoeke, “gastrointestinal disorders, musculoskeletal conditions, respiratory diseases, liver diseases, and urinary and renal problems were found to be higher

in IPV+ [exposed] women" (2021, p. 9). These studies, e.g. Al-Modallal (2016); Chandan, Thomas, Bradbury-Jones, et al. (2019); Winter and Stephenson (2013), are detailed in Tables 4.1 and 4.3.

In the updated systematic review, associations were reported with chronic diseases that have not yet been discussed. One study found that middle aged women who had experienced IPV had increased risk for nausea and/or vomiting (AOR 2.90 [1.70-5.00]), gastrointestinal tract disorders (AOR 1.50 [1.10-2.10]), and non-infectious genitourinary disorders (AOR 1.50 [1.10- 2.00]) (Makaroun et al., 2020). In this same study, older women's IPV exposure was associated with different health outcomes than younger women, including increased risk for skin ulcers or infections (AOR 2.40 [1.30-4.70]) (Makaroun et al., 2020). A study of women in informal settlements in Kenya found that reporting sexual IPV was associated with increased risk (AOR 1.97, $p<0.05$) of experiencing recent gynaecological or reproductive health issues, including urinary tract infections, vaginal infections, candidiasis, bacterial vaginosis (Winter et al., 2020). However, these may have been partially attributable to communicable STIs. In general, the literature in both the expanded analysis of Stubbs and Szoeke and the updated literature confirms that there is evidence for associations between IPV exposure and a wide range of chronic diseases.

4.2.7. Healthcare utilisation

Healthcare utilisation, as a proxy for understanding physical health status, was explored in a number of studies included in Stubbs and Szoeke (2021). This included four studies that found women who experienced IPV were less likely to undergo active preventative screening (Brown et al., 2013; Dutta et al., 2018; Mathew et al., 2013; Rafael & Moura, 2017). Stubbs and Szoeke (2021) also identified two studies that found IPV exposed women engaged with healthcare at a higher rate than women who had not experienced IPV. However, these analyses were conducted using healthcare-seeking samples, which likely overrepresented service use compared with the general population (Montero et al., 2013; Prosman et al., 2012).

A number of studies in the updated systematic review explored healthcare utilisation. Potter et al.'s (2021) study of data from ten countries found that women exposed to a combination of sexual, psychological and physical IPV had increased odds (AOR 1.66 [1.66-2.06]) of spending nights in hospital (aside from childbirth) over the past twelve months, compared with women unexposed to IPV. Another study based in Angola found that non-pregnant women had increased odds of healthcare visits during past 12 months, if they had experienced any IPV (odds ratio [OR] 1.28 [1.03-1.68]), emotional IPV (OR 1.48 [1.15-1.89]) and sexual IPV (OR 1.39 [1.07-1.82]), compared with women who had no

experienced IPV (Yaya et al., 2019). These population-based, representative studies support the claim that women who have experienced IPV are likely to have increased healthcare use. A study of female veterans found that IPV exposure among middle aged women was associated with a higher adjusted rate ratio (ARR) for mental health visits (ARR 2.40 [2.00-2.90]), primary care visits (ARR 1.20 [1.10-1.30]), and emergency department visits (ARR 1.50 [1.20-1.80]) (Makaroun et al., 2020). While this sample was taken from healthcare settings, and though veterans are likely to have a different set of experiences and health conditions than the general population; these findings are consistent with other studies that use non-clinical and population-based samples.

Table 4.3.

Summary of Study Measurements and Key Findings: Expanded Analysis of Studies Included in Stubbs and Szoeke (2021)

First author, year	IPV measure	Control variables/ covariates	Outcome tools/ measures	Key findings	Limitations
Al-Modallal, 2016	**Type:** Phys, sexual, psych **Tool:** AAS **Time:** NR (see limitations) **Category:** yes/no by type	Children status, education, income, employment	Global Self-Rated Health Measure (past 3 month) Past year Dx: hypertension, T2DM, blood disease, hyperlipidaemia, asthma, heart, respiratory, GI, kidney, liver, urinary, or thyroid problems, arthritis, recurrent dizziness, fibromyalgia, joint or back pain	Psych IPV+ had most associations of 3 types: e.g. problems with heart (p=0.03), GI (p=0.02), respiratory (p=0.005), liver (p>0.0001); dizziness (p=0.009), fibromyalgia (p=0.007), joint pain (p=0.004), back pain (p=0.007). *General health:* only psych IPV significant (p=0.007). *Hypertension:* Phys IPV+ (19.1%), IPV- (11.7%); sexual IPV+ (24%), IPV- (11.9%); psych IPV+ (21.2%), IPV- (13%) *T2DM:* Psych IPV+ (21.2%), IPV- (13.0%) *Heart problems:* Psych IPV+ (12.1%), IPV- (2.7%)	*Did not consider any-form IPV or combinations (Stubbs & Szoeke undertook analysis of raw data to compare IPV+ & IPV-) *Small sample size from an already marginalised, disadvantaged population Healthcare seeking sample Measured chi square & prevalence for each type; estimates probability of association but not effect size, difficult to compare. IPV timeframe not clearly reported, 'last year' for phys, 'ever' for psych/sexual.
Basu, 2013	**Type:** Severe phys **Tool:** SVAWS **Time:** Lifetime **Category:** yes/no	Childhood Trauma Questionnaire, Dissociative Experiences Scale, DSM-IV Clinical Interview, Crisis Support Scale, social support, medication, smoking	Basal and diurnal salivary cortisol sampling	IPV+ associated with lower cortisol awakening response, higher dissociative symptoms, flattened diurnal cortisol patterns, higher midday cortisol. Minimal differences between diagnostic groups.	*Small sample size; results not consistent with Kim 2015 Focus on mental health– could not compare cortisol differences with IPV+ women without mental health condition Primarily severe physical IPV. Excluded mild IPV scores below 14, association could be with any IPV. Seems SVAWS recorded current partner only, not specified

First author, year	IPV measure	Control variables/ covariates	Outcome tools/ measures	Key findings	Limitations
Bosch, 2017	**Type:** Phys, sexual **Tool:** BRFSS **Time:** Lifetime **Category:** yes/no	Age, race/ethnicity, marital status, education, annual household income, employment status	*Dx:* BMI, high cholesterol or hypertension *Self-report:* mental health (past month), phys activity, binge drinking, smoking	No association between IPV+ & hypertension or high cholesterol when adj. for demographic variables IPV+ more likely to be current smokers (AOR 2.13 [1.57-2.88]), binge drinkers (AOR 1.89 [1.08-3.30]), obese (AOR 1.44 [1.06-1.96]) & poor mental health (AOR 1.99 [1.34-2.93])	*Phys only IPV type, or unwanted sex No inclusion of psych IPV. Combined types including sexual and threat of phys. Inconsistent with other studies, found no significant association between IPV and hypertension or cholesterol.
Brown, 2013	**Type:** Phys, sexual **Tool:** BRFSS **Time:** Lifetime **Category:** yes/no	Age, income, education, race/ethnicity, marital status, insurance status	*Self-reported screening:* for HIV, cervical cancer, colorectal cancer, cholesterol, & breast cancer	IPV+ more likely to have HIV test (AOR 2.34 [2.06-2.66] or a breast exam (AOR 1.76 [1.37-2.27). Less likely to have mammogram (age 40+) (AOR 0.77 [0.64–0.94]) not adj. for insurance, which attenuated association (AOR 0.86 [0.70–1.05]). Cholesterol and colorectal screening NS.	No inclusion of psych IPV. Combined IPV types incl. sexual & threat of phys. 12-month IPV prevalence reported but measure not recorded or used in analyses.
Campbell, 2018	**Type:** Phys, sexual, CB **Tool:** AAS (phys/sexual), WEB (CB) **Time:** Lifetime **Category:** yes/no	Primary Care-PTSD Screen CES-D	*Probable TBI/ Strangulation:* Danger Assessment & SVAWS *Head injuries/CNS symptoms:* Miller Abuse Phys Symptoms & Injury Scale (inc. headaches, memory loss, dizziness, vision or hearing problems)	IPV+ with probable TBI more likely to report CNS symptoms than those with no probable TBI ($p<0.001$). Probable TBI associated with two point increase in CNS symptom frequency score ($p< 0.001$) when adj. for demographics, IPV, & mental health Headaches only NS CNS symptom 50% probable TBI prevalence in IPV+ women IPV+ 60% dizziness compared with 37% IPV-	*Focused on phys IPV Measured different types & past 2 year/current IPV for eligibility screening but not incl. in analyses Used self-reported (not diagnostic or clinical) data for TBI.

First author, year	IPV measure	Control variables/ covariates	Outcome tools/ measures	Key findings	Limitations
Chandan, 2019	**Type:** NA **Tool:** Read code **Time:** NR **Category:** yes/no	BMI, age, smoking status and Townsend deprivation index at baseline	Clinical Read codes: Temporomandibular joint disorder (TMD)	IPV+ associated with TMD (AIRR 1.45 [1.14-1.84], p<0.002)	Doesn't specify IPV type, relies on clinician reporting of IPV via Read codes: both TMD & IPV likely under recorded.
Clark, 2014	**Type:** Phys, sexual **Tool:** CTS2 (4-item) **Time:** NA **Category:** none, moderate victimisation &/or perp., severe victimisation, severe perp., severe victimisation & perp.	Sex, race/ethnicity, age, education, financial distress Perp.: CTS2	*Hypertension:* defined by SBP>140 mmHg, DBP>90 mmHg, or taking antihypertensive medication	No association between IPV+ & hypertension for women (found in men) NS findings: high cut threshold for severe IPV may indicate higher BP for women: 66th percentile severe victimisation (OR 1.30 [0.80-2.13]), 80th percentile severe victimisation (OR 1.37 [0.74-2.54])	*Did not include emotional IPV Did not adjust for all potential confounding variables, e.g. smoking. Relied on self-report: women reported both perp. and victimisation at a higher rate. IPV recorded by relationships between cohort interview, likely did not capture long-term effects. Perp./victimisation likely highly different risk/response patterns.

First author, year	IPV measure	Control variables/ covariates	Outcome tools/ measures	Key findings	Limitations
Coker, 2017	**Type:** Phys, sexual, psych **Tool**: CTS2, MPAB, WEB **Time**: Lifetime, current **Category**: yes/no by type, combinations	Depression: Brief Symptom Inventory Childhood sexual abuse, Stress Scale Age at Dx, income, cancer site, smoking status, Cancer Registry State, marital status	Functional Assessments of Cancer Therapy & Chronic Illness Therapy-Spiritual Wellbeing	Previous & current IPV associated with poor cancer-related quality of life, incl. depression, stress, & lower functional assessment scores. IPV+ cancer patients more likely to have more than 1 phys comorbidity (adjusted RR 1.35 [1.19-1.54])	Inconsistent with other studies, neither current nor past IPV associated with later stage Dx.
Dichter, 2014	**Type:** Phys, sexual, psych **Tool**: CTS2 (SF) **Time**: Lifetime **Category**: yes/no by type	Age, race, employment status, education, household income, children; branch, period, length of military service	*Self-reported Dx:* PTSD, depression, bipolar, or anxiety Sleep difficulties, frequent headaches, chronic pain Alcohol: CAGE Scale Smoking status Self-rated health	Exclusive phys IPV+ not associated with health outcomes compared with IPV- Sexual IPV+ associated with poor/fair general health (AOR 3.07 [1.22-7.30], smoking (AOR 3.15 [1.14-8.75]), & problem drinking (AOR 3.84 [1.04-14.26]) Exclusive psych IPV+ more likely to report poor/fair general health (AOR 2.74 [1.03-7.24]) than IPV-, not associated with other outcomes.	Veterans already traumatised population with high rates of PTSD Sample already seeking healthcare, so not representative of all veterans. Short form CTS2 only has 2 measures for each type.

First author, year	IPV measure	Control variables/ covariates	Outcome tools/ measures	Key findings	Limitations
Dutta, 2018	**Type:** Phys, sexual **Tool**: CTS2 (10-item), DHS **Time**: Lifetime **Category**: yes/no	Age, religion, education, wealth quintile, exposure to family planning on television	*Self-report:* ever screened for cervical cancer	IPV+ lower odds (AOR 0.78 p<0.001) of being screened for cervical cancer than IPV- women	*Physical IPV only Sample was made smaller to only incl. those who responded to cervical cancer questions, not all participants knew what this was & not all answered IPV module; likely underrepresented association. Simplified IPV category.
Flanagan, 2016	**Types:** Phys, sexual **Tool**: NR (6-item) **Time**: Past year **Category**: yes/no	Income, race, employment, education, relationship status	Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV, Frequency/quantity of alcohol and cigarettes	IPV+ women with PTSD & alcohol use (but not IPV perpetration) smoked approx. 3 additional cigarettes per day compared with IPV- women with PTSD and alcohol use.	Simplified IPV category, past year IPV likely does not capture long-term effects Did not report whether 6 items from validated scale/tool used in NESARC Smoking as outcome, cannot determine causal pathway.
Gerber, 2012	**Type:** Phys **Tool**: STaT, PVS **Time**: Lifetime, past year **Category**: yes/no by time	PTSD: modified Breslau screening tool Age, insurance, tobacco & alcohol use	Migraine Disability Assessment	No link between lifetime or recent IPV & headache severity. PTSD associated with headache severity. Lifetime IPV associated with PTSD (p=0.0001), but recent IPV was not.	Non-representative, healthcare-seeking population. Headache clinic may capture more severe headaches. Small sample size may have affected statistical significance. Low prevalence of recent IPV, may have impacted ability to reach statistical significance.

First author, year	IPV measure	Control variables/ covariates	Outcome tools/ measures	Key findings	Limitations
Gibson, 2019	**Type:** Phys, sexual, emotional **Tool**: NR (3-item) **Time**: Lifetime **Category**: yes/no by type	DSM-IV PTSD Checklist, Hospital Anxiety & Depression Scale, Dx chronic health conditions Age, race/ethnicity, education, BMI, menopause status, hormone therapy, parity	*Menopause symptoms:* Difficulty sleeping, vasomotor symptoms, vaginal symptoms measured using structured-item questionnaires	IPV+ associated with worse menopause symptoms. Emotional IPV+ associated with difficulty sleeping (AOR 1.36 [1.09-1.71]), night sweats (AOR 1.50 [1.19-1.89]), intercourse pain (AOR 1.60 [1.14-2.25]). Phys IPV+ associated with night sweats (AOR 1.33 [1.03-1.72]). Sexual assault associated with vaginal dryness (AOR 1.41 [1.10-1.82]), vaginal irritation (AOR 1.42 [1.04-1.95]), intercourse pain (AOR 1.44 [1.00-2.06]) When PTSD symptoms associated with menopause symptoms incl. in models, significant associations between IPV & symptoms lessened.	Recorded data on CVD & T2DM but did not report these associations Menopause symptoms not measured with validated instrument. 3 broad questions were used to measure IPV & did not report if validated. 12-month IPV data too small for analyses.
Halpern, 2017	**Type:** Phys **Tool**: PVS (3-item), PASS (Injury) **Time**: Lifetime **Category**: yes/no	Stress: self-reported anxiety & PTSD Age, race, tobacco, alcohol, substance use, marital status	*CVD biomarkers:* Saliva samples analysed using multiplex-ELISA *Self-reported:* chest pain, heart palpitations, hypertension, & medication review	Significant associations with chest pain ($p=0.01$) & heart palpitations ($p=0.02$). NS for IPV+ & hypertension. Of 10 inflammatory cardiovascular biomarkers analysed, IPV+ ($p<0.05$) correlated with Interleukin-1b/sCD40L; TNFa/sCD40L; Myoglobin/IL-1b; CRP/sCD40L; CRP/IL-6; CRP/TNFa; TNFa/sICAM; CRP/MMP9; & TNF-a/Adiponectin, compared with IPV-	*Small sample size, high proportion of IPV (51%). Didn't compare IPV types, focused on phys IPV, including injury. Measured stress by self-reported anxiety or PTSD, may not be strong or reliable metric.

First author, year	IPV measure	Control variables/ covariates	Outcome tools/ measures	Key findings	Limitations
Humphreys, 2012	**Types:** Psych aggression, sexual coercion, phys assaults, injury **Tool**: WEB, CTS2 **Time**: Lifetime **Category**: yes/no by type, severity, duration	Parity, BMI, age, financial, health and marital status, employment, education, smoking, medication, IPV age Beck Depression Inventory PSS Wheaton Social Stress Inventory	Telomere length, single copy gene using a quantitative polymerase chain reaction	IPV+ had shorter telomeres (biomarker of biological age, related to early morbidity & mortality) than IPV- Duration of IPV relationship (p=0.001) & having children (p<0.001) associated with telomere length after adj. for age & BMI. BMI predicted telomere length differently depending on IPV. BMI not associated with telomere length among IPV- women; inversely related to telomere length in IPV+ women. Chronic stress may accelerate cellular aging.	Excluded those still in abusive relationship, included only those out of IPV relationship for 1 year.
Kamimura, 2014	**Type:** Phys, sexual, psych **Tool**: OAS **Time**: Lifetime, current **Category**: yes/no	Gender, ethnicity, education, employment, marital status, birth country	*Phys and mental health*: SF-12 scales *Depression*: Patient Health Questionnaire *Oral health*: Michigan Oral HRQoL Scale *Emotional support:* Medical Outcomes Study Social Support Survey	No difference in self-reported phys health by IPV+ women, slightly better (NS).	Free clinic patients likely to have worse health problems & possibly IPV exposure than general population; sample not representative of usual clinic composition. Study conflicts with other research. Primary aim to record IPV prevalence in free clinic populations. Did not use IPV types or recency in analysis, just descriptive statistics.

First author, year	IPV measure	Control variables/ covariates	Outcome tools/ measures	Key findings	Limitations
Karakurt, 2017	**Type**: NA **Tool**: Database identification **Time**: NA **Category**: yes/no	NR	Categories of IPV-associated health record terms	Acute conditions & injuries highest correlation. IPV+ more likely to have several general health conditions including cardiovascular, musculoskeletal, nervous system, neoplastic & gastrointestinal disorders	*Same dataset/results as Whiting (2017) *Relied on system identification of IPV in diagnosis field ICD code not commonly used, likely to capture more severe cases. 0.4% prevalence indicates serious underreporting & misclassification bias. Only reported effect sizes & tests for top 10 observed terms (all acute injuries), no further examination of health outcomes.
Kim, 2015	**Type**: Phys, psych **Tool**: CTS2 **Time**: Past year **Category**: yes/no by type	Employment, parity Couples' relationship satisfaction: Dyadic Adjustment Scale	Saliva samples (4 daily, 4 days) analysed for cortisol levels	Phys IPV+ women (but not men) associated with higher midday & evening cortisol levels & lower levels of 30-min post-awakening cortisol values. Relationship satisfaction negatively associated with IPV, not diurnal cortisol levels	*Small sample size, results not consistent with Basu and other studies. Women partners of men in longitudinal study of low SES & high levels of juvenile delinquency, not generalisable. Phys IPV may have worse impact on women's health than men's. High prevalence of psych IPV.

First author, year	IPV measure	Control variables/ covariates	Outcome tools/ measures	Key findings	Limitations
Lacey, 2015	**Type**: Severe phys **Tool**: Single measure **Time**: Lifetime **Category**: yes/no	Age, marital status, education, household income, occupational status, region, urbanicity	*Mental health disorders:* WHO Composite International Diagnostic Interview, suicide ideation Self-rated phys health	IPV+ increased risk for any disorder (AOR 3.39 [2.75-4.18]) Incl. any mood disorder (AOR 2.5 [2.00-3.22]), any anxiety disorder (AOR 2.68 [2.18-3.30]), any substance disorder (AOR 4.45 [2.73-7.26]), & poor perceived health (AOR 3.00 [1.97-4.71])	*Racially homogenous, only lifetime severe phys violence Did not report whether compared US Black women with full sample (n=6082), which included other ethnicities. Did not report full sample number of US Black women.
Lacey, 2016	**Type**: Severe phys **Tool**: Single measure **Time**: Lifetime **Category**: yes/no	Generational status, discrimination, age, marital status, education, income, employment status	Lifetime diagnoses of phys health problems	No association between IPV+ & hypertension, T2DM, circulatory problems or osteoporosis; IPV+ had higher prevalence for these conditions. Arthritis higher for IPV+ than IPV- (26.7% vs. 15.5%, $p < 0.05$). IPV+ higher prevalence than IPV- liver problems (3.7% vs. 0.8%, $p < 0.05$), kidney problems (6.0% vs. 1.8%, $p < 0.01$). Eating disorders, anxiety, general substance abuse higher for IPV+ women	*Racially homogenous sample, only lifetime severe phys IPV Relied on self-report of diagnoses.
Loxton, 2017	**Type:** Phys **Tool**: Single measure **Time**: Lifetime **Category**: yes/no	Education, marital status, ability to manage income, urbanicity	Medical Outcome Study SF	Phys IPV+ associated with worse general health, phys function, bodily and role limitations due to phys health	*Physical IPV only Measured by "violent relationship" question Data is unadjusted for confounders Compared measured scores on a scale rather than effect size.

First author, year	IPV measure	Control variables/ covariates	Outcome tools/ measures	Key findings	Limitations
Mason, 2012	**Type**: Phys, psych, sexual **Tool**: WEB (psych) **Time**: Lifetime, current **Category**: yes/no by type, time	Phys/sexual childhood abuse Age, race, parental education, BMI, somatogram score	Self-reported hypertension Dx	Association between severe psych IPV+ & hypertension (AHR 1.24 [1.02-1.53]) adj. for childhood abuse & sociodemographics. No correlation between hypertension & phys IPV+ (AHR 1.06 [1.00-1.12]) or sexual abuse (AHR 0.99 [0.91-1.07]). Younger women had stronger associations, suggesting IPV may influence early onset hypertension.	Phys and sexual abuse questions used lifetime exposures & didn't gather information on timelines, whereas WEB focused on recent exposure & psych. Single measure for each physical and sexual types, tool not reported.
Mason, 2013	**Type**: Phys, psych, sexual **Tool**: WEB (psych) **Time**: Lifetime, current **Category**: yes/no by type, IPV duration, time since IPV	Childhood abuse Age, race, parental education, somatogram, BMI, smoking, phys activity, alcohol, contraception, parity, menopause, hypertension, cholesterol, nutrition	Self-reported T2DM Dx	Mixed results: T2DM & phys IPV+ (AHR 1.18 [1.00-1.39]), sexual abuse (AHR 1.08 [0.86-1.35]) (NS). Severe psych IPV+ may increase risk for T2DM (AHR 1.78 [1.21-2.61]). Adj. for BMI & other T2DM risk factors reduced risk: Phys IPV+ (AHR 1.12 [0.94-1.33]), psych IPV+ (AHR 1.61 [1.09-2.38]) 5+ years of IPV associated with small increased risk for T2DM (AHR 1.14 [1.01-1.28]	Relied on self-reported diagnosis Didn't gather timing information for IPV types separately, used any IPV for recency. Single measure for each physical and sexual types, tool not reported.

First author, year	IPV measure	Control variables/ covariates	Outcome tools/ measures	Key findings	Limitations
Mason, 2017	**Type:** Phys, sexual **Tool**: CTS2, Sexual Experiences Survey **Time**: Lifetime **Category**: yes/no by type, combination	Depression: Kandel & Davies Scale Age, race/ethnicity, socioeconomic status, baseline BMI	BMI change (internally validated)	Combined phys & sexual IPV+ associated with NS increased 5-year BMI 1.1 kg/m2 [-0.2-2.4]. Among IPV+, depressive mood associated with NS additional increase in BMI of 1.8 kg/m2 [0.2–3.4], compared with no depressive mood.	Combined past year and lifetime IPV exposure due to small numbers. CTS2/ Sexual Experiences Survey adapted to single measure per type.
Mathew, 2013	*IPV as outcome* **Type**: phys, sexual, verbal **Tool**: UVPS **Time**: Past year **Category**: yes/no	Age, employment, education	*Exposure* Health status, HIV status & testing, regular doctor, pap smears & breast exams frequency	Women who performed monthly self-breast exams half as likely to experience IPV as those who rarely examined themselves (AOR 0.470 p=0.010). Health status not associated with IPV, no association with regular doctor.	*IPV as outcome problematically suggests screening protective for IPV Low recruitment rate (43.6%) Those not fluent in English, critically ill, or psychotic excluded – likely underestimates IPV & health status. Used simplified screening measure designed for healthcare settings
McCloskey, 2017	**Type**: Phys **Tool**: CTS2, WEB **Time**: Lifetime, past year **Category**: yes/no	Education, birth country, financial aid, race, parity, abortion history Childhood sexual abuse, coerced sex	Self-reported bilateral tubal ligation, hysterectomy	IPV+ women more likely to choose sterilisation (OR 2.42 [1.15-5.07]). Childhood sexual abuse predicted entry into abusive relationship (OR 6.7 [3.36-13.41]).	Non-representative healthcare-seeking population Compared previous year IPV/current partner with lifetime. Only relationships since age 20 Only asked questions relating to phys IPV, collapsed sexual IPV Combined IPV & coerced sex (any man aside from current partner)

First author, year	IPV measure	Control variables/ covariates	Outcome tools/ measures	Key findings	Limitations
Montero, 2013	**Type**: Phys, sexual, psych **Tool**: NR **Time**: Lifetime **Category**: yes/no by type, combination, frequency, duration	Age, marital status, education, birth country, monthly household income, social support	*Psych distress:* General Health Questionnaire *Somatic Complaints* (1 or more, binary): e.g. headaches, urinary, gastrointestinal, neck/back pain, gynaecological problems Self-report medication & health service use	Increased healthcare use for IPV+ women. Combined phys/psych IPV+ associated with tranquilizers/antidepressants (AOR 2.24 [1.49-3.38]) Exclusive phys IPV+: somatic issues NS (AOR 3.17 [0.88-11.3]) IPV+ associated with analgesia use (AOR 1.68 [1.21-2.22]), somatic symptoms (AOR 2.03 [1.21-3.41]) >1 type of IPV worse health effects than IPV- Phys/sexual IPV more likely to affect phys health, psych IPV affects psych health. 6.4% IPV+ reported IPV lasted 20+ years	*Recruited participants already actively seeking healthcare Somatic complaints categorised as no or 1 or more, didn't explore specific associations. Used single measure question per type, did not report tool. Due to low numbers of women who had experienced either sexual or phys IPV, grouped together as phys.
Prosman, 2012	**Type:** NR **Tool**: CAS **Time**: NR **Category**: yes/no	Controls matched by: GP practice, age, # of children, birth country, education	*Clustered electronic records for problems:* e.g. musculoskeletal, trauma, reproductive, substance abuse. *Healthcare utilisation:* consultation rate/year, number of diagnostic referrals, specialists, mental health services, past 5 year prescriptions incl. tranquilizers, anti-depressants, analgesia	IPV+ women visit family doctor nearly twice as much as IPV-. Mean consultation rate/year IPV+ 6.7, IPV- 4.7. For social problems (OR 3.5 [1.2-10.5]), substance abuse (OR 4.6 [0.9-22.7]), reproductive problems (OR 3.0 [1.3-6.8]). IPV+ associated with diagnostic referral (OR 3.6 [1.1-12.2]). Neurological & musculoskeletal outcomes NS. Comparing CAS with electronic records found GP aware of IPV in 20% of cases - all GPs had been trained to screen for IPV in past 3-6 years.	*Recruited participants already actively seeking healthcare Small sample size Relied on electronic health records for diagnoses; likely problems with underreporting healthcare issues. Didn't specify IPV types.

First author, year	IPV measure	Control variables/ covariates	Outcome tools/ measures	Key findings	Limitations
Rafael, 2017	*IPV as outcome* **Type:** Severe phys **Tool**: CTS2 **Time**: Current **Category**: yes/no	Age, colour/ethnicity, conjugal status, education, economic class, housing conditions, alcohol Bidirectional violence	*Case/exposure:* women who had not had cervical cytology test in past 3 years	Severe phys IPV against woman (AOR 2.2 [1.1-4.4]) and IPV co-occurrence in relationship (AOR 3.8 [1.4-9.8]) risk factors for inadequate screening. Alcohol abuse by woman was effect modifier for not having test among IPV+ (AOR 10.2 [1.8-56.4]) & in cases of co-occurring IPV (AOR 8.5 [1.4-50.7]).	*Physical IPV only IPV as outcome measure Only measured current partner, not lifetime Clinical setting is already healthcare seeking
Roos, 2017	**Type:** NR **Tool**: AAS **Time**: Lifetime, past year **Category**: yes/no	Alcohol Use Disorders Identification Test, Mini International Neuropsychiatric Interview	Computed brain volume & cortical thickness	IPV+ (excluding brain injury) had altered brain connectivity, incl. cognitive/emotional control region, unrelated to PTSD. IPV+ had higher alcohol use scores.	Sample had high prevalence of IPV & alcohol abuse & were of lower SES. Study controlled for alcohol where possible but sample too small to adjust for mental health. Didn't specify IPV types.

First author, year	IPV measure	Control variables/ covariates	Outcome tools/ measures	Key findings	Limitations
Stene, 2013	**Type:** Phys/Sexual, psych **Tool**: NorAQ (5-item) **Time**: Lifetime **Category**: yes/no by type	Mental distress: Hopkins Symptoms Checklist-10 Education, employment, marital status, parity, smoking, alcohol use	*Framingham 10-year CVD risk:* BMI, abdominal obesity, total & HDL cholesterol, triglycerides, BP, T2DM, CVD in family, Phys activity *Medications:* Cardiovascular, lipid-modifying, anti-hypertensive	Phys/sexual IPV+ associated with CVD risk factors: abdominal obesity, low HDL cholesterol, & elevated triglycerides. Phys/sexual IPV+ associated with antihypertensive medication: AIRR (age adj.) 1.27 [1.02–1.58] & AIRR (education & BP adj.) 1.36 [1.09–1.70]. No link between IPV & BMI, total cholesterol, hypertension, T2DM, phys activity, or CVD in family.	Selection bias may have underestimated IPV+ as several groups underrepresented, including low SES. Only reported IRR for medications, just prevalence for other outcomes Combined phys & sexual IPV – didn't report risk for any IPV.
Stöckl, 2015	**Types:** Phys, sexual, emotional, economic, CB **Tool**: CTS2 (phys/ sexual) **Time**: Past year, current **Category**: yes/no by type	Occupation, relationship status, parity, perception of neighbourhood, urbanicity	*50 non-standardised questions:* Gastrointestinal, psychosomatic, pelvic, mild or strong psych, allergy, weight issues	All types of IPV had a number of significant associations with health symptoms across all age groups, including gastrointestinal, psychosomatic, pelvic, and weight problems. CB most consistently associated with most health symptoms. Economic abuse had fewer associations with health symptoms than other IPV types.	Only measured past year IPV and current partners, excluded lifetime IPV from former partners. Did not report tool used for IPV types other than physical or sexual (CTS2), stated no standardised definition or tool Did not report associations for combined age groups

First author, year	IPV measure	Control variables/ covariates	Outcome tools/ measures	Key findings	Limitations
Whiting, 2017	**Type:** NA **Tool**: Record 'domestic abuse' **Time**: NA **Category**: yes/no	NR	Categories of IPV-associated health record terms	Network mapping to compare health categories for IPV victims found acute conditions strongly associated with cardiovascular, GI, gynaecological, & neurological conditions among IPV+ women.	*Same dataset at Karakurt, same limitations Did not return results for IPV for a dozen of 50 location; classification or reporting bias.
Winter, 2013	**Type**: Phys, sexual, verbal **Tool**: NR **Time**: Past year **Category**: yes/no by type, number of types	DHS Wealth Index, region, age, education, urbanicity, parity, contraception, extramarital sex partners, marital duration, husband's education	Self-reported reproductive tract infections (RTI)	IPV+ increased risk RTIs, genital sores, abnormal vaginal discharge. Genital sores: verbal abuse (AOR 1.73 [1.41-2.11]), phys IPV+ (AOR 1.63 [1.36-1.93]), sexual IPV+ (AOR 1.82 [1.47-2.25]). Abnormal genital discharge: verbal (AOR 1.47 [1.32-1.63]), phys IPV+ (AOR 1.56 [1.43-1.71]), sexual IPV+ (AOR 1.45 [1.29-1.63]). ORs increased for number IPV types: all 3 IPV types AOR 4.69 [3.52-6.23] for genital sores, compared with AOR 1.98 [1.67-2.36] for 1 type	Only included married women & past year IPV, could not record for long-term IPV, former partners or currently unmarried women. Used questionnaire for each type, tool not reported.
Wright, 2021 (2018)	**Type**: Phys, sexual **Tool**: CTS2 **Time**: Past year **Category**: yes/no	Health insurance, childhood abuse, race/ethnicity, sexual orientation, education, household income, financial stress, health & pregnancy status	*Framingham 30-year CVD risk:* incl. age, gender, systolic BP, antihypertensive medications, T2DM Dx, BMI, smoking status	1% increased CVD risk for past year IPV+. NS after adj. for demographic or predictor variables. Highlights the complexity of IPV risk factors.	Combined types in IPV exposure. 20% of the sample were of a sexual minority group, more likely to experience IPV (26.5% vs. 18.5%, $p < .01$), issues comparing with other populations.

First author, year	IPV measure	Control variables/ covariates	Outcome tools/ measures	Key findings	Limitations
Wright, 2019	**Type**: Phys, sexual **Tool**: CTS2 **Time**: Past year **Category**: yes/no	CES-D, PSS, DSM-IV Alcohol Abuse Health insurance, childhood abuse, race/ethnicity, sexual orientation, education, household income, financial stress, health & pregnancy status	*Framingham 30-year CVD risk:* incl. age, gender, systolic BP, antihypertensive medications, T2DM Dx, BMI, smoking status	IPV+ & 30-year CVD risk score remained significant after controlling for depressive symptoms (p=0.003). Stress (p<0.01) & depressive symptoms (p<0.01) partial mediators of risk between IPV & CVD, alcohol dependence not.	15% IPV, lower than other national prevalence & may also have had low rates of alcohol dependence, thus underestimate association. Simplified IPV definition: no reporting on whether included psych IPV questions.

Note. * Refers to limitations identified by Stubbs & Szoeke (2021).

Square brackets present 95% confidence intervals. Significance set at p=<0.05 in all studies.

Type = IPV type measured in data collection; Tool = IPV measurement tool reported; Time = IPV exposure timeframe measured; Category = IPV exposure categories used in analysis

AAS = Abuse Assessment Screen; Adj. = adjusted; AHR = Adjusted hazard ratio; AIRR = Adjusted incidence rate ratio; AOR = adjusted odds ratio; ARR = Adjusted rate ratio; BMI = Body mass index; BP = blood pressure; BRFSS = Behavioural Risk Factor Surveillance System; CAS = Composite Abuse Scale; CB = controlling behaviours; CES-D = Center for Epidemiologic Studies Depression Scale; CNS = Central nervous system; CTS2 = Revised Conflict Tactics Scale; CVD = cardiovascular disease; DHS = Demographic and Health Surveys; DSM-IV = Diagnostic and Statistical Manual of Mental Disorders, 4th Edition; Dx = diagnosis; GI = gastrointestinal; GP = general practitioner; HDL = high-density lipoprotein; HRQoL = Health-related quality of life; ICD = International Classification of Diseases; incl.= including; IPV+ = women exposed to IPV; IPV- = women unexposed to IPV; MPAB = Measure of Psychologically Abusive Behaviors; NA = not applicable; NESARC = National Epidemiologic Survey on Alcohol and Related Conditions; NorAQ = NorVold Abuse Questionnaire; NR = not reported; NS = not statistically significant; OAS = Ongoing Abuse Screen; PASS = Partner Abuse Symptom Scale; perp. = perpetration; Phys. = physical; Psych. = psychological; PSS = Perceived Stress Scale; PTSD = Post-traumatic stress disorder; PVS = Partner Violence Screen; RR = relative risk; RTI = reproductive tract infection; SF = Short-Form; StaT = "Slapped, Threatened, and Throw" instrument; SVAWS = Severity of Violence Against Women Scales; TBI = Traumatic brain injury; TMD = Temporomandibular joint disorder; T2DM = Type 2 diabetes mellitus; UVPS = Universal Violence Prevention Screen; WEB = Women's Experience with Battering Scale

Table 4.4.

Summary of Study Measurements and Key Findings: Updated Systematic Review (May 2019 - April 2021)

First author, year	IPV measure	Control variables or covariates	Outcome Tools/ Measures	Key findings	Limitations
Alhalal, 2020	**Type:** phys, sexual, psych **Tool**: CAS **Time**: past year **Category**: yes/no by severity	Age, income, education, parity, marriage duration, polygamy Connor-Davidson Resilience Scale PTSD Checklist CES-D	Hair cortisol concentration	Significant difference in hair cortisol levels between IPV+ and IPV- women. IPV severity & resilience both predicted lower hair cortisol concentrations, after adjustment for PTSD & depressive symptoms.	Combined IPV type in analysis, differences not reported Only past year IPV, likely not long-term effects Cultural factors difficult to generalise, e.g. 13.5% in polygamous marriage, 17.9% employed.
Brown, 2020	**Type:** phys, sexual, psych **Tool**: CAS **Time**: 1, 4, & 10 years postpartum **Category**: yes/no by recency	Age, relationship status, birth country, education	*Functional health:* SF-36 Phys Health Component Self-rated health status Incontinence Other symptom checklist Current: asthma, CVD, hypertension, diabetes *Mental health:* CES-D, Beck Anxiety Inventory, PTSD Checklist	At 10 years, recent IPV+ assoc. poor functional health (AOR 4.5 [3.2-6.3]), back pain (AOR 2.0 [1.4-2.9]), incontinence (AOR 1.8 [1.2-2.6]), depressive symptoms (AOR 4.9 [3.2-7.5]), anxiety (AOR 5.1 [3.0-8.6]) & PTSD symptoms (AOR 7.2 [4.6-11.1]). Any IPV: worse phys score (AOR 2.8 [2.1-3.8]), poor health (AOR 2.1 [1.5-2.8]), hypertension/heart disease/diabetes (AOR 1.7 [1.0-2.9]). Recent IPV worst health impacts, past IPV worse than no IPV.	Conflated phys & psych IPV, may have obscured key differences in exposure type, or misclassified those experiencing other types such as sexual Adj. for maternal education & age but no other potential confounders

First author, year	IPV measure	Control variables or covariates	Outcome Tools/ Measures	Key findings	Limitations
Chandan, 2019	**Type:** NA **Tool**: Read code **Time**: NR **Category:** yes/no	Read codes: Age, Townsend deprivation score, alcohol & smoking status, BMI, depression & anxiety	*Electronic health record Read codes:* Fibromyalgia, CFS	IPV+ increased risk for fibromyalgia (AIRR 1.73 [1.36-2.22]), CFS (AIRR 1.92 [1.11-3.33]), compared with IPV-. Adj. for depression & anxiety, effect size was reduced, fibromyalgia (AIRR 1.39 [1.08-1.78]), CFS (AIRR 1.46 [0.83-2.55]), NS	Relied on patient disclosure of IPV & covariates to clinicians, likely underreported. Author's other studies using dataset reported 0.2% IPV prevalence, low compared with other estimates. Could not measure specific IPV types or other IPV factors
Chandan, 2020	**Type:** NA **Tool**: Read code **Time**: NR **Category:** yes/no	Read codes: Age, Townsend deprivation score, alcohol & smoking status, BMI	*Electronic health record Read codes:* development of CVD, hypertension, T2DM, all-cause mortality	IPV+ increased risk for CVD (AIRR 1.31 [1.11-1.55]), ischaemic CVD (AIRR 1.40 [1.09-1.79]), stroke/transient ischaemic attack (AIRR 1.29 [1.02-1.63]). T2DM (AIRR 1.51 [1.30-1.76]), all-cause mortality (AIRR 1.44 [1.24-1.67]). Hypertension NS (AIRR 0.99 [0.88–1.12]).	As in Chandan (2019), same dataset. Author's other studies reported 0.2% IPV prevalence, likely seriously underreported. Did not conduct sensitivity tests for depression and anxiety
Chandan, 2021	**Type:** NA **Tool**: Read code **Time**: NR **Category:** yes/no	Age, gender, depression, anxiety, serious mental ill health, deprivation score, BMI, alcohol & smoking status	*Electronic health record Read codes:* development of CSS sensitisation disorders incl. chronic lower back pain, interstitial cystitis, vulvodynia, chronic headaches, myofascial pain syndrome, irritable bowel syndrome, restless legs syndrome	IPV+ associated with syndromes related to CSS: chronic lower back pain (AIRR 2.28 [1.85-2.80]), chronic headaches (AIRR 3.15 [1.07-9.23]), irritable bowel syndrome (AIRR 1.41 [1.25-1.60]) & restless legs syndrome (AIRR 1.89 [1.44-2.48]). No associations with: interstitial cystitis (AIRR 0.52 [0.14-1.93]), vulvodynia (AIRR 0.42 [0.14-1.25]) & myofascial pain syndrome (AIRR 1.01 [0.28-3.61]).	As in Chandan (2019), same dataset. To calculate incidence, patients with pre-existing CSS illness were excluded, may underestimate prevalence. Only 0.2% of the population identified as exposed to IPV: likely seriously underreported.

First author, year	IPV measure	Control variables or covariates	Outcome Tools/ Measures	Key findings	Limitations
Coker, 2019	**Type:** Phys, sexual, stalking **Tool**: BRFSS **Time**: Lifetime, current **Category**: yes/no by type, by time	Age, education, sexual orientation, employment, health insurance, urbanicity BRFSS: child abuse, social support, sedentary lifestyle, smoking, problem alcohol use Current stress: single measure	Current phys & mental HRQoL	Current IPV increased risk of poor phys HRQoL (APRR 3.34 [2.33-4.81]), past IPV (not current) increased risk of poor phys HRQoL (APRR 2.14 [1.90-2.41]). APRRs had greatest reduction when adj. for current stress, -43.4% for those with current IPV and -25.7% for past IPV. Negative health behaviours not a strong mediator.	Did not report specific tool used by BRFSS. Did not compare IPV types in outcome, compared recency & overlap with childhood sexual abuse & sexual assault Sample was largely self-selected, possibly reflected healthier population Used simplified general health outcomes
Hayes, 2020	**Type:** Phys, coercive control, reproductive control, psych aggression, sexual **Tool**: NR (NISVS) **Time**: past year **Category**: yes/no by type	Insufficient money for doctor, worried about housing, worried about nutritious meals, income, lived with child, education, race, gender	Self-reported phys & mental health	Past year IPV did not predict poor/fair phys health. Phys IPV+ (OR 1.04, NS), reproductive control (OR 0.80, NS), coercive control (OR 0.96, NS), psych aggression (OR 0.93, NS). Poor mental health strong association with poor phys health (OR 8.78, $p<0.001$).	Did not measure lifetime IPV Findings conflict with other studies Did not present full analyses that explored IPV types Sexual victimisation included non-partners Did not report tool used in NISVS Only presented bivariate analyses, including for potential confounders

First author, year	IPV measure	Control variables or covariates	Outcome Tools/ Measures	Key findings	Limitations
Makaroun, 2020	**Type:** Phys, psych, sexual **Tool**: E-HITS **Time**: past year **Category**: yes/no	Age, race/ethnicity, marital status Veteran status Combat service Military sexual trauma	Medical record ICD codes *Mental health:* anxiety, PTSD, depression, substance use disorder, suicidal ideation/self-harm *Phys health:* chronic pain, hypertension, nausea/ vomiting, GI tract disorders, noninfectious genitourinary disorders, urinary tract infections, headache, injuries/burns, skin ulcers/infections *Healthcare utilisation:* 20-month post-IPV screening	Associations different for age groups: *Middle aged women IPV+:* nausea &/or vomiting (AOR 2.90 [1.70-5.00]), GI tract disorders (AOR 1.50 [1.10-2.10]), & genitourinary disorders AOR 1.50 [1.10-2.00]. *Older women IPV+:* headaches (AOR 2.10 [1.20-3.90]), injuries & burns (AOR 2.10 [1.00-4.30]), skin ulcers/infections (AOR 2.40 [1.30-4.70]). *Middle aged IPV+:* mental health visits (ARR 2.40 [2.00-2.90]), primary care visits (ARR 1.20 [1.10-1.30]), & emergency department visits (ARR 1.50 [1.20-1.80]). *Older women IPV+:* mental health visits (ARR 1.90 [1.30-2.70]), no other visit types.	Veteran population likely to have a different set of experiences and health conditions than the general population; not easily generalisable. Did not report on results for different forms of IPV exposure Only recorded health problems recorded after IPV screening; may underreport either exposure or outcomes depending on timing.
Nur, 2020	**Type**: NA **Tool**: CTS2 (single measure) **Time**: past year **Category**: yes/no	Age, weight, height, education, employment status, smoking & alcohol history, household income, obstetric information, sexual satisfaction	*HRQoL:* SF-36 scales, incl. phys functioning, role limitations from emotional or phys problems, body pain, social functioning, general health perceptions, vitality, & mental health	Worse phys HRQoL: less than high school education (AOR 2.00 [1.33-3.02]), chronic illness (AOR 2.49 [1.88-3.30]), & experience (AOR 1.59 [1.09-2.31]), & IPV experience (AOR 1.71 [1.21–2.40]). Worse mental health associated with IPV+ (AOR 2.25 [1.55-2.98])	IPV not central exposure - though other factors inform important correlates. IPV exposure complexities not considered. IPV types collapsed into one question, "any domestic violence in last 12 months". Not behavioural question from CTS2

First author, year	IPV measure	Control variables or covariates	Outcome Tools/ Measures	Key findings	Limitations
Potter, 2020	**Type**: Phys, sexual, psych **Tool**: CAS **Time**: Lifetime, past year **Category**: yes/no by type, combinations, time	Age, education, partnership status, site	Self-rated health status Past year nights in hospital (other than childbirth) Phys symptoms: SF-12 scales, incl. difficulty walking/daily activities, pain, memory, dizziness, vaginal discharge Mental health Self-report Questionnaire Past 4 weeks medication	All IPV categories associated with poorer health outcomes. Combined sexual, psych/phys IPV: self-reported poor or very poor health: (AOR 1.90 [1.62-2.22]), recent difficulty with daily activities (AOR 1.95 [1.70-2.24]), pain or discomfort in past 4 weeks (AOR 1.87 [1.69-2.07]), dizziness (AOR 1.99 [1.82-2.19]), memory/concentration issues past 4 weeks (AOR 2.30 [2.05-2.59]), nights in hospital (AOR 1.66 [1.66-2.06]). Effects larger for poor health outcomes if past year IPV, decreased effects for >12 months.	Now old dataset (from 2000) Cross-sectional study cannot assume causation Only included women up to 49 years old, may have underestimated effects on health over time.
Winter, 2020	**Type:** Phys, sexual, psych **Tool**: Modified DHS **Time**: past year **Category**: yes/no by type	Age, marital status, education, employment, smoking & alcohol history, household income, parity, having a business, access to water & sanitation	*Mental & phys health:* SF-36 incl. phys & role functioning, pain, general Kessler Scale of Psych Distress, Patient Health Depression scale *Reproductive:* past year Dx: urinary tract & vaginal infections, hemorrhoids, candidiasis, vaginitis, bacterial vaginosis	Phys IPV associated with (AOR 0.36 p<0.001) for normal/high self-rated phys health score. Sexual IPV+ associated with recent reproductive health issue (AOR 1.97 p<0.05). Other associations NS.	Small sample size Informal settlement not generalisable setting, likely different health risk factors and environments Only past year IPV; difficult for long-term outcomes

First author, year	IPV measure	Control variables or covariates	Outcome Tools/ Measures	Key findings	Limitations
Yaya, 2019	**Type:** Phys, emotional, sexual **Tool**: NR (DHS) **Time**: Lifetime **Category**: yes/no by type	Age, urbanicity, education, religion, wealth status, occupation, household position, pregnancy, husband's education & alcohol use, age difference, church frequency, medical care	Self-reported medical visits during last 12 months	Nonpregnant women who experienced any IPV (OR 1.28 [1.03-1.68]) emotional (OR 1.48 [1.15-1.89]) and sexual IPV (OR 1.39 [1.07-1.82]) had increase odds of healthcare visits during last 12 months	Self-reported healthcare use Not reported whether associations with healthcare use by IPV type adj for confounders in analyses Does not report IPV tool used in Angola DHS (multiple questions per type).

Note. Square brackets present 95% confidence intervals. Significance set at p=0.05 in all studies.

Type = IPV type measured in data collection; Tool = IPV measurement tool reported; Time = IPV exposure timeframe measured; Category = IPV exposure categories used in analysis

Adj. = adjusted; AIRR = Adjusted incidence rate ratio; AOR = adjusted odds ratio; APRR = Adjusted prevalence rate ratio; ARR = Adjusted rate ratio; BMI = Body mass index; BRFSS = Behavioural Risk Factor Surveillance System; CAS = Composite Abuse Scale; CES-D = Center for Epidemiologic Studies Depression Scale; CFS = Chronic fatigue syndrome; CSS = Central sensitivity syndromes; CTS2 = Revised Conflict Tactics Scale; CVD = cardiovascular disease; DHS = Demographic and Health Surveys; Dx = diagnosis; E-HITS = Extended – Hurt, Insulted, Threaten, Scream Tool; GI = gastrointestinal; GP = general practitioner; HRQoL = Health-related quality of life; ICD = International Classification of Diseases; incl.= including; IPV+ = women exposed to IPV; IPV- = women unexposed to IPV; NA = not applicable; NISVS = National Intimate Partner and Sexual Violence Survey; NR = not reported; NS = not statistically significant; OR = unadjusted odds ratio; Phys. = physical; Psych. = psychological; PTSD = Post-traumatic stress disorder; SF = Short-Form; T2DM = Type 2 diabetes mellitus

4.3. Measurements Used in Included Studies

4.3.1. IPV exposure

Stubbs and Szoeke (2021) noted that many studies included in their review excluded measurements for psychological and sexual IPV despite evidence that both types, particularly psychological IPV, are risk factors for a range of adverse health outcomes. Relatedly, the authors highlighted the limitations associated with IPV exposure being obtained via existing databases, as oversimplification and reliance on previous disclosure likely result in underestimation of IPV prevalence (Stubbs & Szoeke, 2021).

Table 4.3 identifies the IPV measures used by studies included in Stubbs and Szoeke, and Table 4.4 outlines those used by studies in the updated systematic review. Below, the IPV exposure measures identified in the studies are presented and critically assessed by the parameters of measurement tools, IPV types, multiple types of IPV, timing of IPV, and other IPV measures.

4.3.1.1. Tools. IPV exposure was determined using varying measurement tools across the 48 studies. Thirteen surveys reported using the Revised Conflict Tactics Scale (CTS2). However, comparability between these studies was difficult as many utilised single measure questions adapted from the CTS2 (for single measure IPV, or one measure per IPV type), sometimes in combination with other tools. One study measured IPV by a single question adapted from CTS2, pertaining to 'any domestic violence in last 12 months' (Nur, 2020). The second most commonly utilised measurement was the Women's Experience of Battering (WEB) tool (n=6), followed by the Composite Abuse Scale (CAS) (n=4) which integrates various types of IPV. One study used the Measure of Psychologically Abusive Behaviours (MPAB) to measure severe psychological abuse separately from all other types (Coker et al., 2017). Several other tools (e.g., SVAWS, PASS, PVS, AAS, STaT) were each used by one or two studies. Numerous other studies did not report using a specific validated tool, or identify a tool that a series of IPV-related questions were based on. Six studies using two large datasets of electronic health records identified IPV exposure through patients having IPV listed in their health records (Chandan et al., 2021; Chandan, Thomas, Bradbury-Jones, et al., 2019; Chandan et al., 2020; Chandan, Thomas, Raza, et al., 2019; Karakurt et al., 2017; Whiting et al., 2017).

4.3.1.2. IPV types. Stubbs and Szoeke (2021) emphasised the importance of differentiating between IPV types in order to explore variable risk profiles, and also briefly noted that studies should additionally report on the effect of exposure to *any* IPV and multiple types of IPV. In the present review, studies which separately analysed IPV types consistently found different associations and

effect sizes with health outcomes. For example, Stöckl & Penhale (2015) measured a number of IPV types: physical and/or sexual IPV, emotional abuse, economic abuse, and controlling behaviour, and found that specific IPV types were differently associated with health outcomes. Despite the established evidence for distinctive effects of IPV by type, many studies continued to record IPV exposure using broad questions (primarily pertaining to physical IPV) and then defined IPV exposure through simplified dichotomous variables of either yes or no for the analysis. Several studies gathered data on different IPV types and subsequently collapsed them into a binary variable in analysis, obscuring the effects of IPV types (e.g., Brown et al., 2020).

Definitions of IPV, including definitions of specific IPV types, also varied across studies. For example, some defined psychological IPV as verbal IPV (Mathew et al., 2013; Winter & Stephenson, 2013), and others differentiated further subcategories such as stalking or controlling behaviour (Coker et al., 2019; Hayes & Kopp, 2020). Further, some studies included exposure to non-partner sexual victimisation in their definition of sexual assault (Hayes & Kopp, 2020; McCloskey et al., 2017). Thus, it is also important to consider differential definitions of specific IPV types when comparing findings between studies.

4.3.1.3. Multiple types of IPV. The number of IPV types experienced, as well as specific combinations of IPV types, was assessed in some studies. One study reported on exposure to exclusive types of IPV (only psychological, only physical, or only sexual), as well as combined psychological and physical IPV and combined sexual, psychological and/or physical IPV, finding that associations with worse health outcomes were strongest for combinations of multiple IPV types (Potter et al., 2021). However, this study did not report the findings for comparisons between any IPV and no IPV, which makes it difficult to understand how much of the associations are attributable to experiencing any IPV in general. One study (which also compared combined types) found that exposure to more than one type of IPV had worse physical health outcomes than those who had not experienced any IPV (Montero et al., 2013). Winter & Stephenson (2013) compared reproductive tract infections outcomes by number (1, any 2, all 3) of IPV types (verbal, physical, and sexual) experienced, and found statistically significant differences in associations by number of IPV types: for example, experience of all 3 IPV types had an AOR 4.69 [3.52-6.23] for genital sores, compared with 1 type (AOR 1.98 [1.67-2.36]).

4.3.1.4. Timing of IPV. The effects of lifetime versus recent IPV were also explored in a range of studies. An Australian prospective cohort study found that when IPV exposure was measured at 10 years postpartum, recently IPV exposed women were more likely to have poor functional health status

(AOR 4.5 [3.2-6.3]), back pain (AOR 2.0 [1.4-2.9]), incontinence (AOR 1.8 [1.2-2.6]), and post-traumatic stress symptoms (AOR 7.2 [4.6-11.1]) (Brown et al., 2020). While those who had experienced recent IPV had the worst health impacts, those who had experienced past IPV also had worse physical health outcomes than those who had never experienced IPV: any IPV had higher odds of a low functional health score (AOR 2.8 [2.1-3.8]) and self-reported poor health (AOR 2.1 [1.5-2.8]) (Brown et al., 2020). However, this study did not compare specific types of IPV and conflated physical and psychological IPV, which may have obscured key differences in exposure types and misclassified those experiencing other forms such as economic or sexual abuse. Recency of IPV, sexual assault, and child abuse was assessed in Coker et al.'s (2019) study; finding that both recency and number of violence forms were positively associated with poorer HRQoL, and those who reported experiencing current IPV self-rated their physical health as worse than those who experienced past IPV and past sexual assault.

4.3.1.5. Other IPV measures. IPV severity and duration were considered in a number of studies. Some studies posited that severity could contribute to worse health outcomes, one study indicated that a high cut threshold for severe IPV may increase risk for hypertension, though these results were not statistically significant (Clark et al., 2014). In another example, Mason et al.'s (2013) large longitudinal study found that five or more cumulative years of IPV exposure produced a modest increased hazard ratio for type 2 diabetes (AHR 1.14 [1.01-1.28]), and experience of severe psychological abuse produced a higher association (AHR 1.78 [1.21-2.61]). Four studies focused on severe physical IPV, however these studies used single measure exposures so it is not possible to deduce whether associations are caused by the severity of the IPV or IPV exposure in general (Basu et al., 2013; Lacey & Mouzon, 2016; Lacey et al., 2015; Rafael & Moura, 2017).

4.3.2 Control variables or covariates

Studies employed a range of control variables and covariates in analyses; variation can be partially explained given the range of different physical health outcomes measured across the studies. Beyond potential sociodemographic confounders, key themes emerged for additional factors that may require consideration in the analysis of the association between IPV exposure and physical health outcomes.

Table 4.3 identifies the control variables and covariates (including measurement tools where relevant) used by studies included in Stubbs and Szoeke, and Table 4.4 outlines those used by studies in the updated systematic review. This synthesis presents these control variables and covariates by the parameters of sociodemographic variables, health risk behaviours, mental health, and childhood abuse.

4.3.2.1 Sociodemographic variables. Studies consistently adjusted for potential confounding by age and ethnicity in analysing the association between exposure to IPV and physical health outcomes. Adjustments were also made for socioeconomic status using indicators such as education level, income, employment status, and insurance status. Marital status and parity were also adjusted for in many studies. Additional measures were controlled for dependent on their relevance to specific sample settings or other health outcomes (e.g., BMI).

4.3.2.2. Health risk behaviours. Substance use (including alcohol and cigarette smoking) were included in many studies, as they are risk factors for a range of long-term health problems. However, studies used different statistical methods to account for these variables. While the updated systematic review did not set out to intentionally capture substance use as an outcome measure in itself, several studies identified by Stubbs and Szoeke (2021) assessed the associations between IPV exposure and substance use as an outcome. One study found strong correlations between physical and/or sexual IPV and psychological IPV with smoking ($p<0.001$) and problem drinking ($p=0.014$) (Stene et al., 2013). Another study found that those exposed to severe physical IPV had increased risk of receiving a diagnosis of any substance abuse disorder (AOR 4.45 [2.73-7.26] (Lacey et al., 2015). However, cross-sectional studies cannot determine causation.

Other studies adjusted for substance use as a potential confounder between IPV and health outcomes. For example, Chandan et al.'s four studies adjusted for both drinking and smoking status (2021; 2019; 2020; 2019). However, lifestyle factors may sit on the mediating pathway between IPV and physical health outcomes, and should not be haphazardly adjusted as confounders. Few studies situated substance use on the causal pathway, using analytic methods to determine their potential mediation or moderation effects. Rafael and Moura (2017) explored substance use as an effect modifier with results showing the greatest effect modification was observed for women exposed to severe physical IPV who *also* reported alcohol abuse, having significantly increased odds of not undergoing cervical cancer screening. One study found that negative health behaviours (including problem alcohol use, sedentary lifestyle, and smoking) were not a strong mediator between IPV and poorer HRQoL (Coker et al., 2019). Wright et al. (2019) found that alcohol dependence was not a partial mediator between IPV and CVD. However, this study found that stress and depression were both partial mediators of the risk between IPV and CVD (Wright et al., 2019). Thus, health risk behaviours may play a complex role in the development of poor health outcomes for women exposed to IPV.

4.3.3.4. Mental health. Despite this review's primary focus on physical health outcomes, numerous studies also explored mental health as additional outcomes or covariates. Poor mental health is prevalent among women exposed to IPV; it is an important factor to consider in associations between IPV and physical health, as it may serve as a confounding variable or sit along the causal pathways for health problems (Bosch et al., 2017). PTSD in particular was explored in several studies, as women exposed to IPV are estimated to have PTSD prevalence rates between 45% and 81% (Basu et al., 2013). One study found that women recently exposed to IPV had substantially increased odds of reporting PTSD symptoms (AOR 7.2 [4.6-11.1]) (Brown et al., 2020). Major depressive disorder and other mood problems were also associated with both PTSD and IPV (Basu et al., 2013). Several studies adjusted for PTSD diagnosis or symptoms (e.g., Alhalal & Falatah, 2020; Campbell et al., 2018). Many studies found that the effects of IPV on physical health outcomes were mediated or modified by factors such as depression, perceived stress, resilience and social support (Alhalal & Falatah, 2020; Coker et al., 2019; Montero et al., 2013; Wright et al., 2019). Data on individual mental health and social factors were collected using broad range of tools and measures. For example, stress measures varied from validated tools such as the Perceived Stress Scale (e.g., Humphreys et al., 2012), to stress status derived from self-reported anxiety or PTSD (Halpern et al., 2017). These findings highlight the complex relationship between IPV exposure, mental health, and physical health factors and outcomes, as well as the potential moderating effect of external factors such as social support.

4.3.3.5. Childhood abuse. Multiple studies adjusted for childhood abuse as a potential confounder in analyses (Basu et al., 2013; Mason et al., 2012; Mason et al., 2013). Adjustment for exposure to childhood abuse attempts to ensure that effect sizes are attributable to IPV in adulthood, rather than confounding effects from childhood abuse. In one study, childhood abuse predicted later entry into an abusive relationship by almost seven-fold (McCloskey et al., 2017). Furthermore, women who reported past year IPV were more likely to have a history of childhood abuse (27.7% vs. 18.6%, $p < .01$) (Wright et al., 2019, 2021). One study found that 24.6% of their sample had experienced childhood abuse (Coker et al., 2019). Exposure to multiple types of victimisation, including sexual abuse from a non-partner and child abuse, were factored in a number of studies. One study found that those exposed to three forms of interpersonal violence, including IPV, had a higher prevalence rate ratio for current poor physical health (APRR 3.75 [3.12-4.53]) than exposure to current IPV or past IPV alone (Coker et al., 2019). Strong association between multiple victimisations and poor HRQoL was sustained after adjustment for stress, support, and negative health behaviours (Coker et al., 2019).

Chapter 5. Discussion of Structured Literature Review

This section will summarise key findings specifically in relation to the objectives for this literature review. It will then discuss the limitations of the evidence included in the review and of the review processes used. Finally, it will briefly conclude the structured literature review in preparation for the subsequent data analysis in Chapter 6.

5.1. Primary Objective

Objective 1: to review the published literature to determine what is currently known about the associations between women's exposure to intimate partner violence and non-communicable physical health outcomes.

Overall, the review revealed that research exploring the association between IPV and non-communicable physical health outcomes has proliferated since Campbell's article was published in 2002. Significant associations have been found, spanning a wide range of physical health outcomes. Studies consistently found that women who have experienced IPV were more likely to self-rate their physical health status as worse than women who had not experienced IPV. New research has also corroborated earlier findings that suggested women who experience IPV are at increased risk for chronic pain via central sensitivity syndromes and functional disorders, including fibromyalgia (Chandan et al., 2021; Chandan, Thomas, Raza, et al., 2019). As identified in earlier systematic reviews, findings for cardiovascular health outcomes, namely type 2 diabetes and hypertension, were inconsistent across studies (Liu et al., 2020; Stubbs & Szoeke, 2021). However, two studies on cardiovascular risks and outcomes (notably CVDs) in the updated systematic review found strong associations with previous IPV exposure (Brown et al., 2020; Chandan et al., 2020). Stubbs and Szoeke also noted the paucity of research relating to endocrine disorders and neurological conditions; the updated search was undertaken to ensure newer research into these areas was captured (2021). Alhalal & Falatah's (2020) study on cortisol dysregulation was the only study found which updated the results in Yim & Kofman's (2019) systematic review, and supported the conclusions presented there. However, it appears that endocrinological and neurological outcomes are still largely under-researched and continue to produce inconsistent results.

The review consistently found that healthcare utilisation rates were higher among women who had experienced IPV; however, further research on this topic needs to be conducted using population-based, representative samples as opposed to samples recruited from healthcare settings.

Compared with Dillon et al.'s 2013 review, which captured a significant proportion of convenience samples (e.g., healthcare clinics), it can be observed that population-based and representative samples are increasingly available, which strengthens the generalisability of findings and diminishes risks of bias. However, this is partially due to greater availability of electronic health records and big data, which come with their own sets of limitations and risk of biases (further discussed under secondary objective).

5.2. Secondary Objective

Objective 1a: to identify and critically assess commonly utilised exposure and control variables or covariates in the analysis of exposure to IPV and physical health outcomes

Most studies in the review gathered IPV exposure from respondents using validated measures, such as the Revised Conflict Tactics Scale (CTS2) or Women's Experiencing of Battering (WEB) tool. The CTS2 is the most widely used and researched tool for measuring 'family conflict'; nevertheless, the revised version faces similar critiques to its original predecessor (Jones et al., 2017). This included criticism for promoting gender symmetry in IPV, that is, suggesting men are victims of violence from their female partners at similar rates and severity, and was also criticised for decontextualising violence (Dobash et al., 1992; Jones et al., 2017). While psychometric validity has been established for the CTS2 in the US, ongoing research is required to confirm reliability and validity of the tool in a wide range of international cultural settings and languages (Jones et al., 2017).

It is difficult to compare how IPV types and severity were assessed across studies, as the definitions used were highly variable and measurement tool revisions were often insufficiently reported. Further, numerous studies did not report which IPV assessment tools they used or adapted for their questionnaires, with many using single measures to record IPV experience. In particular, the studies which measured IPV by the single questions "…any domestic violence during last 12 months" (presented as an adaptation from the CTS2), and "Have you ever been in a violent relationship with a partner/spouse?" are cause for concern as no similar measure can be found in in the CTS2 tool, which exclusively uses behavioural questions (Loxton et al., 2017, p. 3; Nur, 2020, p. 537; Straus et al., 1996).

Ethical procedures for IPV research emphasise the importance of asking behaviour-based questions to maximise disclosure and ensure data accuracy from respondents, rather than using subjective or emotive questions with terms such as 'domestic abuse' or requiring participants to self-identify as abused or battered (García-Moreno et al., 2006; Krug et al., 2002). Inconsistencies in IPV measurements are likely to contribute to the widely varying prevalence for IPV across studies, in addition to differing sample settings and populations.

These findings corroborate Stubbs and Szoeke's (2021) contention that nuances of IPV experiences may be erased through oversimplified scales; studies need to be designed to capture IPV exposure from the outset through validated and ethically sound research tools. Further, the review identified increasing usage of large electronic datasets to mine IPV exposure and outcomes. While usage of these datasets (e.g. healthcare electronic records) provide useful insights, it should be noted that IPV is seldom identified or disclosed in healthcare settings; which echoes Stubbs and Szoeke's (2021) concern that reliance on blunt instruments in existing clinical records likely underestimates the true prevalence of IPV. For example, one study compared survey disclosure with clinician records to estimate that IPV was identified by general practitioners for only 20% of victims, despite recent clinician training for IPV screening in this sample setting (Prosman et al., 2012).

This review also echoes the finding of Stubbs and Szoeke (2021), as psychological IPV in particular was largely excluded from IPV measurement definitions and analyses in the present literature review, despite mounting evidence that psychological IPV accounts for significant associations with poor health outcomes. This exclusion is especially perplexing where studies recorded data on numerous IPV types, then proceeded to collapse them into a binary variable in analysis. Importantly, the updated literature review went beyond the conclusions in Stubbs and Szoeke (2021) by identifying further nuances in IPV measurement and analysis in emerging literature, which may be crucial in capturing effects of IPV on health outcomes. This includes important variables such as additional IPV types such as economic abuse, controlling behaviours and stalking, IPV severity, number of IPV types, and specific combinations of IPV types for comparing outcomes within analyses. In the same vein, this review supports calls from Dillon et al. (2013) for the crucial need to use standardised and consistent measures for IPV exposure, as varying methods used to identify or quantify IPV likely contribute to inconsistent findings.

Aside from adjustment for sociodemographic and socioeconomic factors, mental health, social support and substance use were sporadically controlled for as confounders or measured as mediators in

analyses. The results of these studies suggests that non-physical variables play important roles in the causal pathways for physical health outcomes, and may contribute to identification of intervention possibilities in future.

5.3. Strengths and Limitations of the Included Studies

Strengths of the included studies are attributable to the range of sample settings, countries, and observational study designs. Undertaking research on a sensitive and potentially dangerous topic such as IPV requires strict consideration of ethical and practical factors; the majority of the included studies adhered to high methodological standards.

Although 26 of the 48 included studies were drawn from population-based samples, many were drawn from non-representative samples, including non-generalisable and marginalised specific demographic groups. Further, 16 studies recruited from healthcare settings, which introduced the risk of selection bias and residual confounding by healthcare seeking behaviours.

As described previously in the literature review results chapter, IPV measures were inconsistent and often oversimplified across studies. This likely obscured nuances within experiences of IPV and conflated different types within simplified measures, which raises issues with misclassification bias.

Underreporting bias is a common limitation in studies exploring exposure to IPV, and should be taken into consideration when reviewing the findings presented in the included studies. In particular, IPV exposure status was likely highly underreported in several studies where it was mined from healthcare electronic records. Though diagnostic data derived from electronic health sources is not prone to self-reporting bias, it relies on health status disclosure to clinicians and captures a healthcare-seeking population.

Particular study methods likely contributed to some studies failure to find significant associations between IPV and health outcomes. For example, studies that sought to use direct biological measures are costly to implement, which may have contributed to small sample sizes. Further, studies with limited assessment of IPV experiences or reliance on IPV recorded within health records may have contributed to low prevalence of IPV in the samples, which likely affected statistical significance of findings.

Most studies focused on women between 18 and 45; however, studies that included women in older age groups found that the effects of IPV exposure may persist into older age, and older women may have different outcomes than younger women. For example, one study of middle aged and older women found that experience of IPV may persist in older age groups (Makaroun et al., 2020). It has been hypothesised that older women are more likely to underreport IPV in their current long-term relationships if violence has occurred a long time ago, in contrast to women who experienced violence recently (Stöckl & Penhale, 2015). Scholars have also suggested that older women's reports of IPV may also be more likely to be impacted by social desirability bias, as they may be hesitant or unable to report current IPV due to strong associations of victimisation with stigma and shame, as well as factors of economic dependence and social isolation (Stöckl & Penhale, 2015). This highlights the importance of including older women in data gathering, and also the importance of stratifying and separately analysing data by age groups.

It is notable that no NZ based studies satisfied the criteria for inclusion in this literature review.

5.4. Strengths of this Structured Literature Review

Both the expanded analysis of selected studies included in Stubbs and Szoeke and the updated systematic review were developed in conversation with JF, LH, and VS. The expanded analysis of studies included in Stubbs and Szoeke (2021) enabled comprehensive reporting, comparison, and analysis of the studies, which had not been previously conducted by the authors. By synthesising studies from the expanded analysis of Stubbs and Szoeke (2021) and more recent publications identified in the updated systematic literature review results together, a detailed and comprehensive discussion of relevant research over the past decade was presented.

Three major databases were selected based on their scope and reputability. The detailed inclusion and exclusion criteria supported certainty throughout the screening process, and ensured continuity with the previous literature reviews of both Stubbs and Szoeke (2021) and Dillon et al. (2013), with minor differences justified where applicable. Data extraction was purposeful and comprehensive, and completed based on a form adapted from Cochrane.

This structured literature review adhered to a high standard of reporting for evidence factors, ensuring that all appropriate items in the 2020 PRISMA reporting guidelines for systematic reviews were

sufficiently reported where applicable (Page et al., 2021). A copy of the PRISMA checklist is located in Appendix 3.

This structured literature review captured a broad snapshot of the field over the past decade by including a wide range of physical health outcomes. Exclusion of communicable diseases enabled a focused analysis on physical health outcomes that insofar have been underexplored in the literature.

5.5. Limitations of this Structured Literature Review

Following on from the inclusion protocol of Stubbs and Szoeke (2021), the updated systematic review required that studies must have included an unexposed comparison group. There were a number of interesting studies thus excluded which compared the intricate impacts of different types of IPV exposure on outcomes. Given that evidence suggests different types of IPV are associated with different outcomes and effect sizes, factors considered in these excluded articles should be considered going forward. For example, a study of survivors of IPV found associations of physical health outcomes between factors including number of recent physical IPV experiences, number of recent stalking experiences, presence of injury, presence of fear, and poor mental health (Cheng & Lo, 2019). Another study contributed to the gap in literature on the neurological impacts of IPV by exploring perceived executive functioning, finding that survivors reported high levels of impairment in executive functioning, which was also associated with PTSD, IPV severity, and depression (Daugherty et al., 2021). Therefore, it is important that future studies include comparisons between no IPV exposure and specific IPV types, in order for the effect of IPV types to be compared with any or no IPV exposure, so that future reviewers can determine the relevance of these factors. Further, the updated systematic review retained Stubbs and Szoeke's (2021) decision to include studies from non-representative settings for continuity, though limitations of the generalisability of these studies are noted.

As this review was conducted independently by one reviewer (BM), in keeping with time and resource limitations for an MPH, records were assessed by only one person. This created a greater risk of missing or misclassifying relevant studies, and it is possible that grey literature was missed in the updated search. BM screened the full de-duplicated list twice and the final 25 items several times in order to ensure reliability and was guided by clear inclusion and exclusion criteria adapted from Stubbs and Szoeke, however it is possible that gaps remained.

A risk of bias protocol was not developed or implemented given the number of studies collated within the full literature review. By only including published journal articles, the study selection process may have been subjected to the publication bias towards studies that produce significant results, which may have presented an overestimation of found associations. This review was limited by exclusively reviewing literature published in English, as pertinent research produced in non-English settings were excluded by design.

5.6. Research Implications

This review highlighted the need for future research which uses population-based and representative samples to explore the association between women's exposure to IPV and non-communicable physical health outcomes, including for older women. Consistent use of standardised tools and protocols for data collection is needed to ensure ethical methodological procedures and best practice for IPV-related research are adhered to. A broad range of physical health outcomes have been associated with IPV exposure, however more research is required to confirm associations with specific diseases and risk factors. The review emphasised current inconsistencies with IPV measurement tools and definitions, and indicated that the use of validated and inclusive tools could help enable comparability between studies. Varied findings between IPV types strongly intimated that data should be collected from respondents on a range of IPV types and factors (including psychological IPV and IPV severity) and this data should be transformed into separate variables for analyses. The review also signalled emerging evidence on analyses by number and combinations of IPV types, and suggests that these be actively considered going forward in order to explore possible dose-response relationships. Research should also gather data on potential mediating and moderating factors, including associations with mental health, for analysing pathways between IPV and physical health outcomes.

5.7. Structured Literature Review Conclusion

While recognising important evidence that found significant associations between IPV exposure and physical health outcomes, existing literature reviews revealed that relevant research has historically featured inconsistencies in study methodologies, particularly discrepancies in IPV measurements and definitions. In light of the substantial development of the field in recent years, the present structured literature review collated findings from 48 publications published between 2012 to 2021 via two parts; an expanded analysis of studies included in Stubbs and Szoeke's (2021) systematic review and an updated systematic review to identify and examine journal articles that were published after Stubbs and Szoeke's review period.

The expanded analysis of studies included in Stubbs and Szoeke (2021) strengthened their recent and inclusive study by further detailing and assessing a range of information from individual and pooled studies, enabling the updated systematic review component to present a continuation of Stubbs and Szoeke's systematic review and comprehensively capture relevant publications over the previous decade. Overall, this structured literature review reinforces the claims of previous reviewers; while many studies indicate that there is an association between IPV and physical health outcomes, these associations and their sizes were largely heterogeneous due to a wide range of IPV and outcome measurements, and differential characteristics of the samples employed. Further, analytic considerations of mental health and substance abuse covariates in numerous studies highlights a complex relationship between IPV, mental health, substance abuse, and physical health outcomes, which is important to consider in understanding associations between experience of IPV and physical health outcomes.

This structured literature review highlighted the need for further research exploring the associations between IPV and physical health outcomes, which should employ population-based and representative samples in order to minimise potential sources of bias and confirm generalisability of findings. Established and standardised IPV measurements should factor IPV severity, different types of IPV, and the impact of multiple types of IPV, and consider lifetime IPV exposure in the study of long-term health effects. This review also highlights the need for a NZ-based study, and supports the value of this thesis in not only contributing to NZ's knowledge of the health impacts of IPV, but the international research field.

Chapter 6. Methods for the Data Analysis

6.1. Introduction

This chapter will begin by restating the objectives and outlining the scope for the data analysis component of this thesis. Secondly, it will describe the 2019 New Zealand Family Violence Survey/He Koiora Matapopore (NZFVS), including survey design and sampling methods, and secondary analysis design and sample for the present study. It will then detail the measurements used by the study, and how these measurements were turned into variables for this analysis.

6.1.1. Objective for the data analysis

Objective 2: To assess the associations between lifetime IPV exposure and health outcomes among women in New Zealand, according to experience of any IPV, IPV severity, IPV type, and multiple types of IPV experienced.

6.2. Scope of Analysis

While the structured literature review focused on examining evidence of the association between IPV experience and non-communicable physical health outcomes, this analysis focuses on examining the associations between IPV experience and health outcomes, including one mental health outcome measure. This was to make the best use of the data available from the NZFVS, and to provide as much information as possible on IPV exposure and health for NZ. This decision was reinforced by findings in the structured literature review showing complex relationships between physical and mental health.

In keeping with Objective 2, this data analysis will primarily explore *associations* between IPV exposure and health outcomes, but does not attempt to identify or measure the causes or pathways (including mediating and moderating factors) for these associations. This was to ensure that the objective could be comprehensively explored within the time and scope constraints of this thesis, but also due to limited data gathered on these mechanisms in the NZFVS. Potential causal pathways will be briefly considered using external research in Chapter 8.

6.3. The 2019 New Zealand Family Violence Survey/He Koiora Matapopore

6.3.1. Survey design

The 2019 NZFVS was a population-based cross-sectional retrospective survey that was designed based on the WHO's internationally standardised Multi-Country Study on Violence Against Women (WHO

MCS). The WHO MCS incorporated recommendations from the International Research Network on Violence Against Women, which was partially established to address challenges pertaining to defining, measuring and comparing violence across diverse cultural settings (García-Moreno et al., 2005). The WHO MCS was informed by research developed through use of the Conflict Tactics Scale (CTS) and its use of behaviourally specific questions about respondents' experiences, while framing questions based on "how partners treat each other rather than so-called conflict negotiation" to capture abuse driven by 'discipline', especially in developing countries (García-Moreno et al., 2006, p. 1262). The WHO MCS was also designed to address criticisms of the CTS as supporting gender symmetry in IPV (Dobash et al., 1992; García-Moreno et al., 2005). The WHO MCS's 12-domain questionnaire was adapted to NZ's local and cultural settings following consultation with NZ government, expert advisors, and Māori groups (Fanslow, Gulliver, et al., 2021). The NZFVS received funding from NZ's Ministry of Business, Innovation and Employment (Contract number: CONT-42799-HASTR-UOA).

The NZFVS built on and updated the 2003 New Zealand Violence Against Women Study (VAW Study), with the primary intention of gathering prevalence data on family violence (Fanslow, Gulliver, et al., 2021). In total, the questionnaire included 528 possible items (Fanslow, Gulliver, et al., 2021). The 2019 NZFVS gathered information on a range of factors relevant to the current study, including physical and mental health indicators and child abuse. In line with later versions of the WHO MCS, the survey also included questions to assess experiences of economic abuse (Fanslow, Gulliver, et al., 2021). The survey included respondents over 65 years, which may be relevant for capturing women who have had time to develop the health outcomes of interest.

6.3.2. Study location

The survey was conducted from March 2017-March 2019 across three NZ regions (Waikato, Northland, and Auckland); these areas were selected as they account for around 40% of the NZ population and cover a range of ethnicities, and rural and urban settings (Fanslow, Gulliver, et al., 2021).

6.3.3. Sampling strategy

Random sampling was conducted through primary sampling units (PSUs) created by meshblock boundaries (Fanslow, Gulliver, et al., 2021). PSUs, the smallest geographical unit used by Statistics New Zealand, were selected following consultation with Statistics New Zealand (Fanslow, Gulliver, et al., 2021). From a random starting point in each meshblock, every second and sixth house was selected (Hashemi et al., 2021). Selection excluded non-residential and short-term residential

properties, rest homes and retirement villages. To ensure safety for participants and keep survey content discrete, meshblocks were separately allocated by gender and only one randomly selected person per household was eligible to participate (Fanslow, Gulliver, et al., 2021). In order to increase participation rates, addresses were matched to a member on the electoral roll, to whom a personally addressed invitation with study information was sent (Fanslow, Gulliver, et al., 2021). To maximise recruitment of study participants, interviewers made between one to seven visits to each selected household (Fanslow, Gulliver, et al., 2021). Participants were randomly selected in households with more than one eligible resident (Fanslow, Gulliver, et al., 2021).

6.3.4. Data collection

Ethics and safety recommendations for research on violence against women were followed throughout the research (WHO, 2001). Survey data was gathered through private face-to-face interviews with written consent from respondents, and without anyone else over two years old present (Fanslow, Gulliver, et al., 2021). All interviewers were thoroughly trained to ensure valid and safe data collection, and all respondents were provided with a list of approved support agencies regardless of IPV disclosure status (Fanslow, Gulliver, et al., 2021). Ethics approval was granted by the University of Auckland Human Participants Ethics Committee (#2015/018244) (Fanslow, Gulliver, et al., 2021). Ethics approval was not required for the present secondary analysis.

6.3.5. 2019 NZFVS participants

Eligibility criteria required that participants were at least 16 years of age, slept in the house at least four nights a week, and could speak conversational English (Fanslow, Gulliver, et al., 2021). 9,568 households were approached, of which 1,532 were ineligible and 1,804 (22.4%) agreed to participate (Fanslow, Gulliver, et al., 2021). 1,271 of the 6,232 households who agreed to participate were ineligible, primarily due to not speaking English or being incapacitated (Hashemi et al., 2021). The NZFVS included data from complete interviews with 1,423 men and 1,464 women (2,887 total participants).

The response rate represented over 60% of eligible persons (63.7% women, 61.3% men) (Fanslow, Gulliver, et al., 2021). The ethnic and deprivation level distributions of the 2019 NZFVS sample was closely comparable with the NZ population (Fanslow, Gulliver, et al., 2021). However, younger age groups were underrepresented in the sample: 3.4% of the sample were 16-19 years of age compared with 7.1% in the general population, and 10.2% of the sample were 20-29 years old compared with 17% in the general population (Fanslow, Gulliver, et al., 2021). Those over 60 years of age were

slightly overrepresented in the sample (33.8%) compared with the general population at 25.3% (Fanslow, Gulliver, et al., 2021).

6.3.6. Data management

Survey data was stored and managed using REDCap data applications. The data was securely hosted and accessed on the University of Auckland servers.

6.4. Present Study

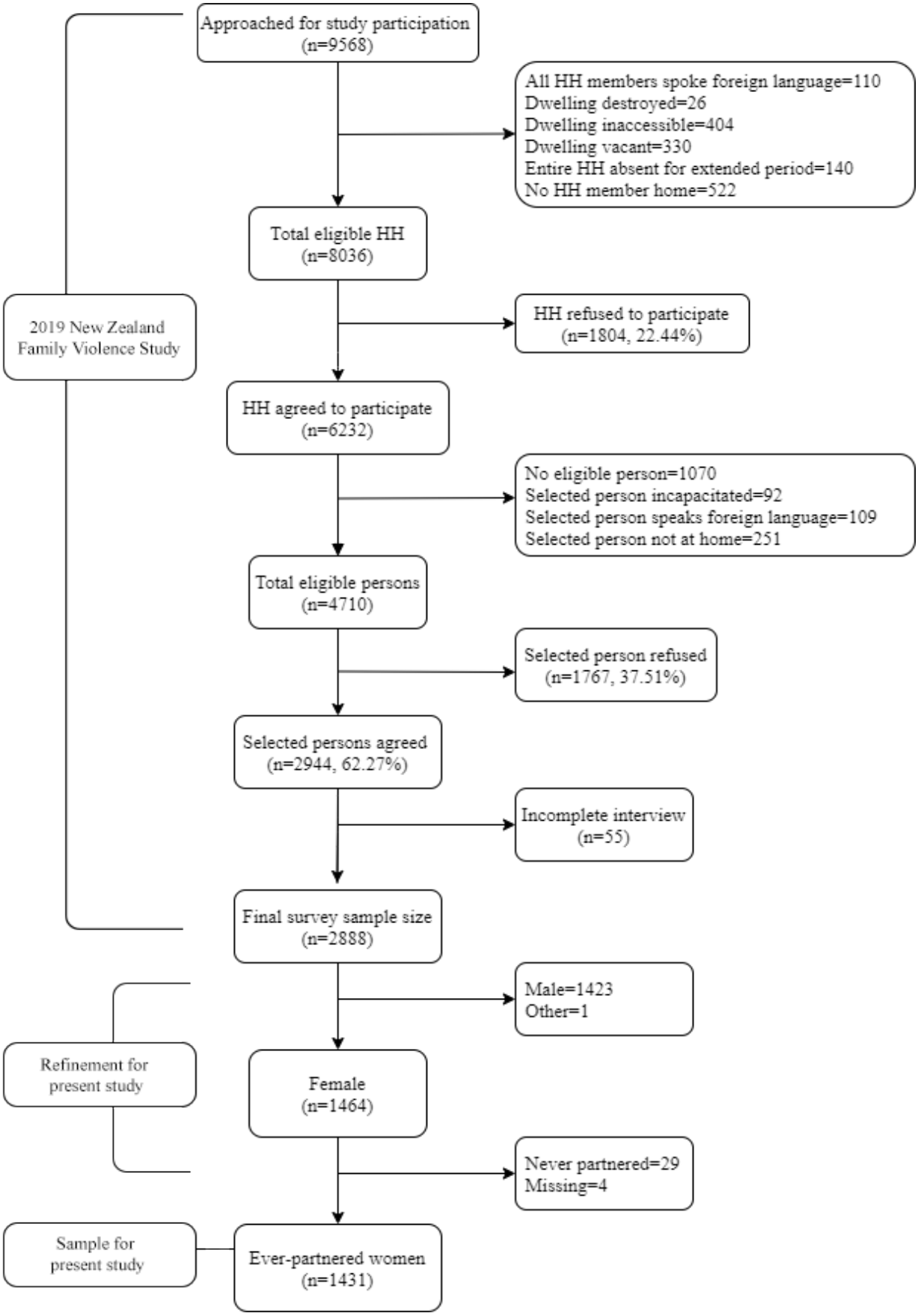
6.4.1. Secondary data analysis design

BM designed the secondary data analysis based on data available in the NZFVS with guidance from JF and LH. This included selection of exposure and outcome measures, variable creation and threshold setting, and sensitivity analyses for control variable selection.

6.4.2. Sample

For the present study, the dataset was refined to only include women (n=1464) and further refined to ever-partnered women, resulting in a total sample size of 1431 participants (Figure 6.1). The ever-partnered variable was generated from responses to the survey by combining answers on whether participants were currently married or had a partner, had ever been married or lived with a partner, or had ever been in a relationship without living together.

Figure 6.1.
Flowchart of NZFVS Recruitment and Refinement for the Present Study Sample



6.5. Measurements for IPV Exposure

Participants' exposure to IPV was assessed using questions pertaining to lifetime experience of violent behaviours inflicted by either a current or any previous partner, based on questions from the WHO MCS. Survey data on 12-month exposure was also gathered; however, they were not used in the present study. This was in keeping with the present study's focus on the long-term impact of IPV exposure on physical health outcomes, and due to the fact that small 12-month exposure numbers may have compromised statistical validity.

6.5.1. Experience of any IPV

Exposure to any lifetime IPV was defined where participants were exposed to any (at least one) type of IPV (physical, sexual, psychological, controlling behaviours, or economic abuse) as determined by the measurement thresholds outlined for each type below.

6.5.2. IPV severity

WHO classifications of "moderate" or "severe" physical violence were utilised, which are based on the likelihood of causing injury (García-Moreno et al., 2005). A variable for moderate physical IPV was defined by responses including slapping and throwing and pushing/shoving or hair pulling, but excluded any exposure to a severe physical IPV behaviour. Severe IPV behaviours included hitting with a fist or something else that could hurt, being kicked, dragged or beaten up, being burnt or choked, or threatened or used a gun, knife or other weapon, and are indicated with an asterisk in Figure 6.2. Each question was followed with "If yes, has this happened before the last 12 months?". A variable for severe physical IPV exposure was defined by responses including experience of at least one of these severe physical IPV behaviours, whether moderate behaviours were present or not.

Figure 6.2.

NZFVS Questions Pertaining to Physical IPV

Has any partner ever **slapped you or thrown something** at you that could hurt you?
Has any partner ever **pushed** you or **shoved** you or **pulled your hair**?
*Has any partner ever **hit** you with **their fist** or with **something else** that could hurt you?
*Has any partner ever **kicked** you**, dragged** you or **beaten** you up?
*Has any partner ever **choked** or **burnt** you on purpose?
*Has any partner ever **threatened to use or actually used a gun, knife, or other weapon** against you?

6.5.3. Types of IPV

Dichotomous variables were created for each of the five specific types of violence (physical, sexual, psychological, controlling behaviours, and economic abuse) by lifetime exposure.

6.5.3.1. Physical IPV. Any physical IPV was defined where participants responded "yes" to any (at least one) of the experiences in Figure 6.2.

6.5.3.2. Sexual IPV. Any sexual IPV was defined where participants responded "yes" to any (at least one) of the experiences in Figure 6.3. Each question was followed with "If yes, has this happened before the last 12 months?".

Figure 6.3.

NZFVS Questions Pertaining to Sexual IPV

Did your current partner or any other partner ever **force** you to have sexual intercourse when you did not want to, for example by **threatening** you or **holding you down**?
Did you ever have **sexual intercourse you did not want to** because you were **afraid** of what your current or any other partner might do if you refused?
Did your current partner or any other partner ever **force** you to do anything else sexual that you did not want or that you found **degrading** or **humiliating**?

6.5.3.3. Psychological IPV. Exposure to lifetime psychological abuse was defined using the threshold of responding "yes" to two or more of the five questions on psychological IPV in Figure 6.4. Each question was followed with "If yes, has this happened before the last 12 months?". A two-measure cutoff was used as singular instances may not be considered part of an abusive pattern (Fanslow, Malihi, et al., 2021a).

Figure 6.4.

NZFVS Questions Pertaining to Psychological IPV

Insulted you or made you feel bad about yourself?
Said or did something that made you feel **humiliated** in front of other people?
Did things that made you feel **scared** or **intimidated**?
Threatened to **harm** you or **someone you care about**?
Destroyed things that are important to you?

6.5.3.4. Controlling behaviours. Exposure to controlling behaviours was defined where participants responded "yes" to at least two of the experiences in Figure 6.5. Each question was followed with "If yes, has this happened before the last 12 months?". A two-measure threshold was used as exposure to at least two controlling behaviours is more likely to capture systematic behaviours rather than act-based, situational violence (Fanslow, Malihi, et al., 2021a; Myhill, 2015). Validation of the WHO MCS has confirmed that psychological IPV and controlling behaviours are separate types and should not be combined in primary analyses (Heise et al., 2019).

Figure 6.5.

NZFVS Questions Pertaining to Controlling Behaviours

Stopped you from seeing your **friends**?
Restricted contact with your **family**?
Insisted on **knowing where you are** in a way that made you feel **controlled** or **afraid**?
Stopped you from getting **healthcare**?

6.5.3.5. Economic abuse. Exposure to economic abuse was defined where participants responded "yes" to any (at least one) of the experiences in Figure 6.6. A single measure threshold was used as economic abuse had a higher degree of missingness (13.2%) compared with other exposure variables. This was because "Not applicable" and "Don't know" answers were coded as missing. The single measure threshold was also important to ensure a broader catchment of yes answers, as 93 of the 189 respondents who were coded as missing had responded yes to at least one other form of IPV.

Figure 6.6.

NZFVS Questions Pertaining to Economic Abuse

Has any partner **pressured** you into **paid work** that you did not want to do?
Have you ever **given up/refused a job** for money because your partner did not want you to work?
Has any partner ever **taken your earnings or savings** from you against your will?
Has any partner ever **refused to give you money** for household expenses, even when they have money for other things?
Has any partner ever **failed to arrive for, or interfered with childcare** when you needed to be at work?

6.5.4. Multiple types of IPV

In order to assess the association between multiple types of IPV with health outcomes, two separate approaches were employed: number of IPV types and combinations of IPV types.

6.5.4.1. Number of IPV types. A categorical 'count' variable was produced for the number of types of IPV experienced out of the total five types (No IPV, 1 type, 2 types, 3 types, 4 or 5 types) during respondents' lifetimes. Any physical IPV was included in the count variable, i.e., moderate and severe physical IPV were not counted separately.

6.5.4.2. Combinations of IPV types. Various methods were trialed to measure the effect of specific combinations of IPV exposure types. Combination variables were initially created where two or more types co-occurred (e.g., physical IPV and psychological IPV); however, many possible combinations existed and it would not be possible to conclude there was no contamination by other types without actively excluding these other types. Doing so would have significantly diminished sample numbers.

Additional variables were also created to compare outcomes by exclusive IPV type exposure (where participants had experienced one type of IPV but no others). However, these variables were excluded from further analysis as the significant overlap in IPV types resulted in unworkable low numbers for most singular types. Figure 7.2 (Chapter 7) illustrates the complexity of exposure to multiple IPV types in the sample.

In conversation with LH, an incremental approach was developed to explore specific combinations of IPV exposure for three key types (psychological, physical, and sexual). This model was created to provide a 'snapshot' of combined exposure to specific types of IPV, using combinations with high prevalence in the sample. This incremental approach was designed based on the prevalence distribution of IPV types in the sample (detailed in Table 7.2 in Chapter 7). Psychological IPV was reported by 32.9% of the sample, followed by physical IPV (reported by 28%), and sexual IPV prominently co-occurred with other types of IPV and was reported by 12.4% of the sample.

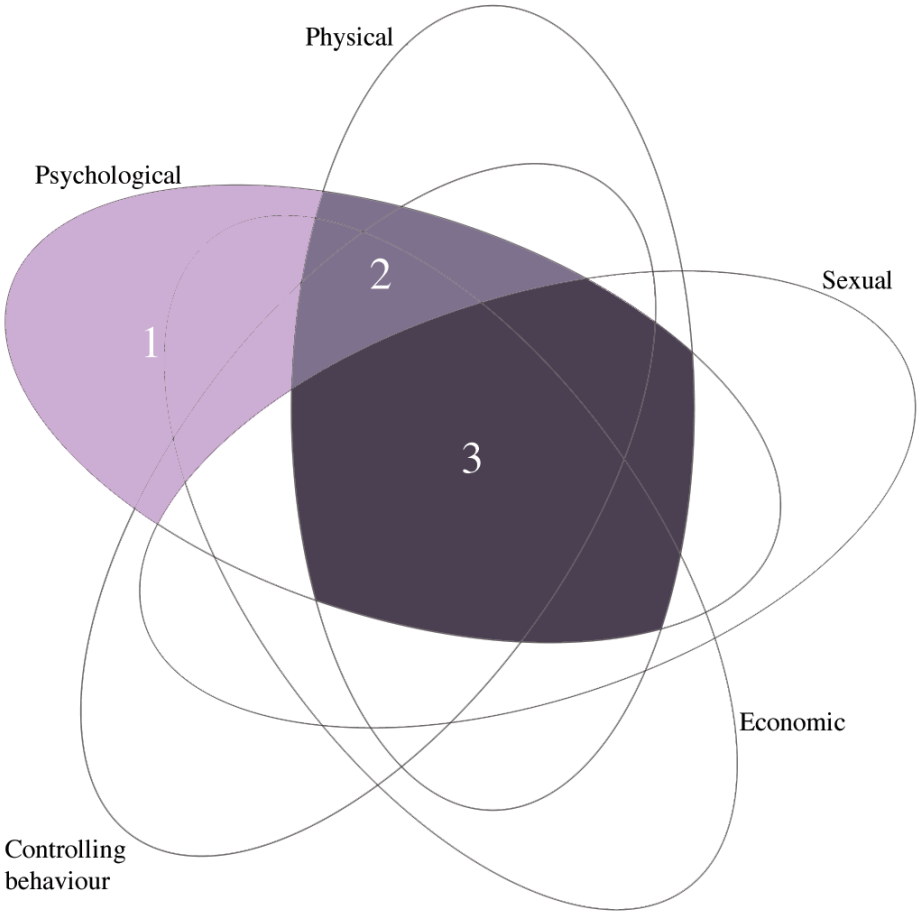
In this model, economic abuse and controlling behaviours were collapsed into the three categories shown in Figure 6.7 (neither actively included or excluded), as there was significant overlap between these two types and those included in the model. The co-occurring nature of these two types (economic abuse and controlling behaviours) with the other three types (psychological, physical and sexual IPV) is illustrated in Figure 7.2. The decision to collapse controlling behaviour and economic abuse is

consistent with methods used by numerous other studies, as they are often considered subsets of psychological IPV (WHO, 2021b). Further, psychological IPV, controlling behaviours and economic abuse were analysed as separate IPV types earlier in the analysis.

For this incremental model, a categorical variable was created in which exposure to psychological IPV ONLY was scored as 1, then those exposed to psychological AND any physical IPV (but not sexual) was scored as 2, then those exposed to psychological AND any physical AND sexual IPV were scored as 3. Exposure to economic abuse and controlling behaviours was not measured. Figure 6.7 illustrates categorisation for this variable.

Figure 6.7.

Categories of IPV Exposure in the Incremental Model, Including Intersections with Controlling Behaviours and Economic Abuse



For the purpose of this model, all others outside of these 3 categories were marked as no IPV and scored 0. Therefore, the 'any IPV' total in this model is smaller than the full sample IPV prevalence as it did not include those exposed to (for example): exclusive physical IPV exposure, exclusive sexual IPV exposure, exclusive exposure to controlling behaviours, exclusive exposure to economic abuse, or exclusively both controlling behaviours and economic abuse. However, given the significant overlap of the most prevalent types of IPV, the three categories of this model captured the majority (n=454) of the 623 women who reported experiencing any IPV.

6.6. Measurements for Health Outcomes

A number of outcomes relating to participants' health were derived from the survey.

6.6.1. Poor general health

Self-reported general health was defined through responses to the question in Figure 6.8, which were categorised into a binary variable with good general health including "excellent"/"good" responses or poor general health including "fair"/"poor"/"very poor" responses.

Figure 6.8.

NZFVS Question Pertaining to General Health

In general, would you describe your **overall health** as excellent, good, fair, poor or very poor?

6.6.2. Recent pain or discomfort

Experience of recent pain or discomfort was defined through responses to the question in Figure 6.9, which were categorised into a binary variable. Responses were scored as 0 (no pain or discomfort) from "no pain at all"/"slight pain or discomfort" responses and 1 (pain or discomfort) including "moderate"/"severe"/"extreme pain or discomfort" responses.

Figure 6.9.

NZFVS Question Pertaining to Recent Pain or Discomfort

In the past four weeks, have you **been in pain or discomfort**? Would you say no pain at all, slight pain or discomfort, moderate, severe, or extreme pain or discomfort?

6.6.3. Recent pain medication

A binary variable was created for taking any pain medication in the past four weeks, based on "yes"/"no" responses to the question in Figure 6.10.

Figure 6.10.

NZFVS Question Pertaining to Pain Medication Use

In the past four weeks, have you taken medication to relieve pain?

6.6.4. Frequent pain medication

A binary variable was created to measure frequency of pain medication based on responses to the question in Figure 6.11, which scored the responses "None"/"once or twice"/"a few times" as 0 (infrequent) and "many times"/"daily" as 1 (frequent).

Figure 6.11.

NZFVS Question Pertaining to Frequent Pain Medication Use

How often? Once or twice, a few times, many times, or daily?

6.6.5. Recent healthcare consultation

Prevalence statistics for the type of healthcare professional consulted were derived from responses to the question in Figure 6.12, which included doctor, nurse, midwife, counsellor, pharmacist, traditional, or other (mainly physiotherapist, dentist, or radiologist). An aggregated binary variable ("yes"/"no") was also created.

Figure 6.12.

NZFVS Question Pertaining to Recent Healthcare Consultation

In the past four weeks, did you **consult a doctor or other professional** or traditional healthcare worker because you were sick?

6.6.6. Any physical health condition

Prevalence data for non-aggregated physical health conditions in response to the question in Figure 6.13 were produced. Due to small numbers for each specific health condition, an aggregate binary variable (any self-report clinically diagnosed chronic physical health condition or no self-report clinically diagnosed chronic physical health condition) was utilised as a primary outcome measure in the current study. This binary variable included physical conditions specified under "Other", which had been coded by a medical research assistant during the data cleaning process. Hypertension was considered a minor chronic health condition compared with other conditions in this variable and thus excluded, as well as mental health conditions.

Figure 6.13.

NZFVS Question Pertaining to Diagnosed Health Conditions

Have you ever been told by your doctor that you have **any of the following long-term health conditions**? Heart disease (including heart attack, angina, or heart failure) cancer, stroke, diabetes (not gestational), asthma, arthritis, depression, anxiety, substance abuse disorder, or other (specify).

6.6.7. Any mental health condition

Prevalence data were explored for responses to specific mental health conditions for the question in Figure 6.13, specifically depression, anxiety, and substance abuse disorder. Due to small numbers for each outcome, a binary variable for diagnosis of any mental health condition was created by aggregating mental health conditions and this was used as a primary outcome.

6.7. Measurements for Sociodemographic Characteristics

Participants were asked a broad range of questions pertaining to sociodemographic factors, including age and ethnicity, and socioeconomic factors such as food security and education. A series of sociodemographic variables were created to examine prevalence rates of the physical health outcomes among population subgroups and to adjust for potentially confounding factors in the multivariable analyses. Age (16-29 years, 30-49 years, 50-69 years, and 70+) was included to account for potential confounding of health status across age groups. Prioritised self-reported ethnicity (NZ European, Māori, Pacific, Asian and Middle Eastern/Latin American/African [MELAA]) was automatically included in line with best practice for reporting by ethnicity in NZ, and to adjust for any confounding for ethnic differences in health outcomes (Ministry of Health [MOH], 2017).

Sensitivity analyses were conducted to explore the impact of characteristics pertaining to socioeconomic status. Variables considered included food security, employment status, educational attainment, personal income, and area deprivation level. Firstly, chi-square associations and bivariate logistic regressions were explored for associations with health outcomes. Secondly, these variables were sequentially added into a base model and tested for statistical significance in both odds ratio associations and overall model fit using multivariable logistic regression. Further sensitivity analyses were conducted to ensure that employment status was not serving as a proxy for age groups. Personal income and area deprivation level did not produce any significant changes to the base model, and were excluded from further analyses.

Ultimately, food security, employment status, and education were retained for use in multivariable analyses, as each of these variables were significantly associated with outcomes in the chi-square tests and bivariate logistic regression, and the base model fit was strengthened by inclusion of these variables. This suggested that ethnicity, food security, educational attainment and employment status sufficiently captured the effects of socioeconomic status. Variables for food security, educational attainment, and employment status were derived from the below questions.

6.7.1. Food security

A binary variable (secure/insecure) was created using the response options of "Never" as 0 (secure) and "Occasionally"/"sometimes"/"often"/"all the time" as 1 (insecure) from responses to the question in Figure 6.14.

Figure 6.14.

NZFVS Question Pertaining to Food Security

Do you ever worry about **not having enough money to buy food**? Never, occasionally, sometimes, often, all the time.

6.7.2. Educational attainment

A binary variable was created from responses "Primary" or "Secondary or higher" to the question in Figure 6.15.

Figure 6.15.

NZFVS Question Pertaining to Education

What is the **highest level of education** that you achieved? Primary, secondary, higher.

6.7.3. Employment status

A categorical variable was created from responses to the question in Figure 6.16, as "Not working", "Housework", "Student", "Retired", or "Employed".

Figure 6.16.

NZFVS Question Pertaining to Employment Status

What is your **main daily occupation**? Not working, housework, student, retired, employed.

6.8. Analytic Procedures

All analyses were conducted in Stata 16.0. Analyses accounted for sampling methods by weighting, including regional stratifications, PSU clustering and eligible participants per household. Problems with missingness were minor; less than 1% for all types of IPV exposure except for economic IPV (with 13.2% missingness driven by "Don't know" "Refused to answer" or "Not applicable"). Less than 1% of data were missing for all seven health outcome variables. All analyses are reported with 95% confidence intervals, with statistical significance set at p-value <0.05.

6.8.1. Descriptive statistics

Weighted proportions (percentages) were used to describe the prevalence of types of IPV exposures in the sample by sociodemographic characteristics (Table 7.2), and to describe the prevalence of health outcomes in the sample by sociodemographic characteristics (Table 7.3).

Bivariate logistic regression analyses were conducted to explore associations between sociodemographic characteristics and IPV exposure by types (Table 7.2), and between sociodemographic characteristics and health outcomes (Table 7.3). Weighted proportions (percentages) were reported for the prevalence of disaggregated data for binary health outcomes. Weighted proportions (percentages) were also used to describe the prevalence of exposure to multiple types of IPV.

6.8.2. Associations between IPV and physical health outcomes

To meet Objective 2: *Analyse data from the 2019 New Zealand Family Violence Study to assess the associations between lifetime IPV exposure and health outcomes, according to experience of any IPV, IPV severity, IPV type, and multiple types of IPV experienced*, the following analyses were conducted.

Bivariate and multivariable logistic regressions were conducted to calculate the odds of experiencing health outcomes for those exposed to any IPV (Table 7.4), by exposure to moderate and severe physical IPV (Table 7.5), by exposure to different IPV types (Table 7.6), by number of IPV types experienced (Table 7.7), and for combinations of IPV types in an incremental model (Table 7.8). Multivariable analyses were adjusted for sociodemographic factors (age, ethnicity, food security, employment status, education). Results were reported as unadjusted and adjusted odds ratios with 95% confidence intervals.

Chapter 7. Results of the Data Analysis

7.1. Descriptive Statistics

7.1.1. Sample characteristics

The mean age of the sample was 52.2 [51.3-53.1] (range: 16-96 years). Consistent with the full NZFVS sample, younger age groups were underrepresented compared with the NZ population, and older age groups were overrepresented. Of the 1,431 ever-partnered women in the sample, 70.4% identified as European, 12.8% identified as Māori. 4.6% identified as Pasifika, and 1.5% identified as MELAA. Table 7.1 shows this was closely representative of NZ's adult female population. Asian respondents were slightly underrepresented (10.6% compared with 15.2% of the NZ population). Area deprivation levels were closely comparable with the NZ population.

Table 7.1.
Demographic Characteristics of Present Study Sample and NZ Female Population

Demographic characteristic	**NZ Female Population*** (%)	**Study Sample**** (%)	**Study Sample** (n)
Total	1,977,339 (n)	100	1431
Age groups, years			
16-29	19.9	10.9	156
30-49	26.4	33.2	474
50-69	23.6	38.3	547
70+	10.2	17.6	252
Ethnicity			
Māori	13.8	12.8	183
Pasifika	6.5	4.6	66
Asian	15.2	10.6	152
MELAA	1.4	1.5	22
European	71.3	70.4	1006
Area deprivation level***			
Least deprived	31.1	29.0	414
Moderately deprived	39.7	40.9	584
Most deprived	29.0	30.1	430

Note. *Census 2018. Data includes all females ages 15+ (StatsNZ, n.d.)
**Unweighted percentages
***Index of Multiple Deprivation (Exeter et al., 2017)

Within the sample, 19.6% experienced food insecurity, 54.4% were currently employed, and 59.4% had received an education higher than secondary schooling

7.1.2. Prevalence of IPV in the sample and across sociodemographic sub-populations

Overall, 43% [40.1-45.9] of women in the sample reported experiencing any IPV over their lifetime. The most prevalent type was psychological IPV (32.9% [30.3-35.6]), followed by any physical IPV (28.0% [25.4-30.8]). Thirty-one percent [28.3-33.8] reported experiencing physical and/or sexual IPV. In this sample, over half (57.3% [51.9-62.5]) of the women who experienced physical IPV reported exposure to severe forms of physical IPV.

By ethnicity, Māori women reported the highest prevalence rate for experiencing any type of IPV (56.5%, [47.2-65.2]), and had greater odds of experiencing severe physical IPV (OR 2.66 [1.77-4.00]), sexual IPV (OR 1.85 [1.19-2.87]), and controlling behaviours (OR 2.92 [1.92-4.43]) compared with European women. Asian women reported the lowest prevalence of any IPV (27.9%, [20.8-36.2]), and were half as likely to report experiencing any IPV compared with European women (OR 0.49 [0.32-0.74]). Food insecurity was the strongest sociodemographic factor associated with IPV exposure across all types, with most women (62.5% [56.1-68.5]) who reported food insecurity having experienced any lifetime IPV. Table 7.2 presents the prevalence and bivariate ORs for IPV types across sociodemographic groups.

Table 7.2.

Prevalence and Bivariate Odds Ratios for the Association Between Sociodemographic Characteristics and IPV Exposure Reported by Ever-Partnered Women in the 2019 NZFVS

	n (W%)	Moderate physical IPV	Severe physical IPV	Any physical IPV	Sexual IPV	Psychological IPV	Controlling behaviours	Economic abuse	Any IPV
n	1431	168	239	407	191	478	176	210	623
(W%)	(100)	(12.0)	(16.0)	(28.0)	(12.4)	(32.9)	(12.2)	(16.2)	(43.0)
					OR (W%)				
Age group									
16-29	156	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	(14.7)	(12.6)	(11.4)	(24.0)	(8.7)	(28.4)	(13.8)	(9.6)	(38.2)
30-49	474	1.07 [0.58-1.98]	1.38 [0.75-2.51]	1.26 [0.79-2.02]	1.58 [0.84-2.99]	1.31 [0.84-2.04]	0.99 [0.57-1.74]	1.88 [0.97-3.66]	1.27 [0.83-1.94]
	(33.8)	(13.4)	(15.1)	(28.5)	(13.1)	(34.1)	(13.7)	(16.6)	(43.9)
50-69	547	0.94 [0.51-1.72]	**1.91 [1.09-3.34]**	1.47 [0.95-2.29]	1.67 [0.92-3.04]	1.47 [0.98-2.21]	0.86 [0.50-1.48]	**2.05 [1.06-3.97]**	**1.46 [1.01-2.12]**
	(36.7)	(11.9)	(19.7)	(31.8)	(13.7)	(36.8)	(12.1)	(17.8)	(47.5)
70+	252	0.63 [0.33-1.24]	1.11 [0.58-2.14]	0.85 [0.52-1.40]	1.28 [0.63-2.58]	0.82 [0.50-1.34]	**0.48 [0.25-0.94]**	1.98 [0.96-4.08]	0.83 [0.53-1.30]
	(14.8)	(8.4)	(12.6)	(21.2)	(10.8)	(24.4)	(7.2)	(17.3)	(33.9)
Ethnicity									
European	1006	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	(65.1)	(12.2)	(14.4)	(26.7)	(12.3)	(34.8)	(10.5)	(15.6)	(44.2)
Māori	183	1.27 [0.73-2.18]	**2.66 [1.77-4.00]**	**2.34 [1.61-3.41]**	**1.85 [1.19-2.87]**	1.47 [1.00-2.17]	**2.92 [1.92-4.43]**	1.58 [0.99-2.51]	**1.64 [1.09-2.46]**
	(14.4)	(14.9)	(30.9)	(46.0)	(20.7)	(44.0)	(25.4)	(22.6)	(56.5)
Pacific	66	0.68 [0.29-1.61]	0.97 [0.44-2.15]	0.81 [0.40-1.64]	0.41 [0.16-1.09]	**0.35 [0.16-0.76]**	1.41 [0.62-3.20]	0.72 [0.33-1.58]	0.54 [0.27-1.07]
	(7.4)	(8.7)	(14.1)	(22.8)	(5.5)	(15.8)	(14.2)	(11.7)	(29.9)
Asian	152	0.67 [0.35-1.26]	**0.51 [0.27-0.99]**	**0.54 [0.33-0.90]**	**0.53 [0.29-0.98]**	**0.45 [0.28-0.73]**	**0.35 [0.17-0.76]**	0.91 [0.52-1.59]	**0.49 [0.32-0.74]**
	(11.6)	(8.5)	(8.0)	(16.4)	(7.0)	(19.4)	(4.0)	(14.4)	(27.9)

	n (W%)	Moderate physical IPV	Severe physical IPV	Any physical IPV	Sexual IPV	Psychological IPV	Controlling behaviours	Economic abuse	Any IPV
MELAA	22 (1.4)	2.01 [0.61-6.56] (21.7)	0.85 [0.25-2.94] (12.5)	1.47 [0.55-3.89] (34.8)	1.07 [0.31-3.65] (13.0)	1.20 [0.49-2.98] (39.1)	1.80 [0.59-5.53] (17.4)	1.35 [0.43-4.23] (20.0)	1.16 [0.47-2.88] (47.8)
Educational attainment									
Primary/ secondary	578 (40.9)	Ref. (11.3)	Ref. (17.5)	Ref. (28.9)	Ref. (13.2)	Ref. (31.6)	Ref. (14.0)	Ref. (15.4)	Ref. (41.6)
Tertiary	847 (59.1)	1.12 [0.76-1.65] (12.5)	0.82 [0.60-1.13] (14.9)	0.93 [0.70-1.23] (27.4)	0.88 [0.63-1.22] (11.8)	1.10 [0.86-1.42] (33.7)	0.76 [0.54-1.07] (11.0)	1.11 [0.80-1.55] (16.8)	1.10 [0.85-1.41] (43.9)
Food security									
Secure	1146 (79.5)	Ref. (10.1)	Ref. (12.5)	Ref. (22.7)	Ref. (9.9)	Ref. (28.6)	Ref. (9.3)	Ref. (12.7)	Ref. (37.9)
Insecure	279 (20.5)	**2.09 [1.41-3.09]** (19.0)	**2.93 [2.11-4.07]** (29.5)	**3.22 [2.43-4.27]** (48.6)	**2.60 [1.82-3.72]** (22.2)	**2.50 [1.86-3.36]** (50.0)	**3.00 [2.08-4.34]** (23.6)	**3.02 [2.10-4.34]** (30.5)	**2.73 [2.03-3.66]** (62.5)
Employment status									
Student	61 (6.2)	Ref. (9.4)	Ref. (10.3)	Ref. (19.8)	Ref. (8.5)	Ref. (27.4)	Ref. (9.4)	Ref. (12.3)	Ref. (35.9)
Not working	90 (6.5)	1.96 [0.62-6.23] (17.0)	2.13 [0.86-5.27] (19.6)	**2.34 [1.03-5.28]** (36.6)	2.06 [0.78-5.44] (16.1)	1.99 [0.94-4.21] (42.9)	1.37 [0.47-4.04] (12.5)	2.58 [0.80-8.25] (26.5)	1.92 [0.91-4.04] (51.8)
Housework	146 (10.4)	1.07 [0.36-3.20] (10.1)	1.90 [0.82-4.42] (17.9)	1.57 [0.71-3.47] (27.9)	1.59 [0.61-4.14] (12.9)	1.00 [0.50-1.99] (27.4)	1.63 [0.60-4.42] (14.5)	1.92 [0.68-5.47] (21.3)	1.02 [0.52-2.00] (36.3)
Retired	355 (21.6)	0.95 [0.35-2.59] (9.0)	1.16 [0.54-2.51] (11.8)	1.07 [0.53-2.17] (21.0)	0.96 [0.41-2.28] (8.2)	0.84 [0.44-1.58] (24.0)	0.67 [0.25-1.82] (6.5)	1.05 [0.37-2.94] (12.8)	0.96 [0.53-1.73] (34.9)
Employed	778 (55.3)	1.46 [0.57-3.76] (13.2)	1.85 [0.91-3.77] (17.5)	1.79 [0.90-3.58] (30.7)	1.75 [0.78-3.91] (14.0)	1.55 [0.84-2.88] (36.9)	1.49 [0.65-3.88] (14.2)	1.31 [0.49-3.48] (15.5)	1.59 [0.88-2.90] (47.1)

Note. Bold font indicates significant result at p <0.05. Square brackets present 95% confidence intervals for odds ratios.

W = Weighted percentage; n = number of participants; OR = unadjusted odds ratio; MELAA = Middle Eastern/Latin American/African

7.1.3. Prevalence of multiple types of IPV experienced

Among women exposed to any IPV, nearly two thirds (63.6% [59.4-67.6]) were exposed to two or more types of IPV. Thirty-six percent [32.4-40.6] of respondents who experienced any IPV reported experiencing only one IPV type, compared with 9.1% [0.69-11.8] exposed to all five types (Figure 7.1).

Figure 7.1.
Number of IPV Types Experienced Among Women Who Reported Any IPV

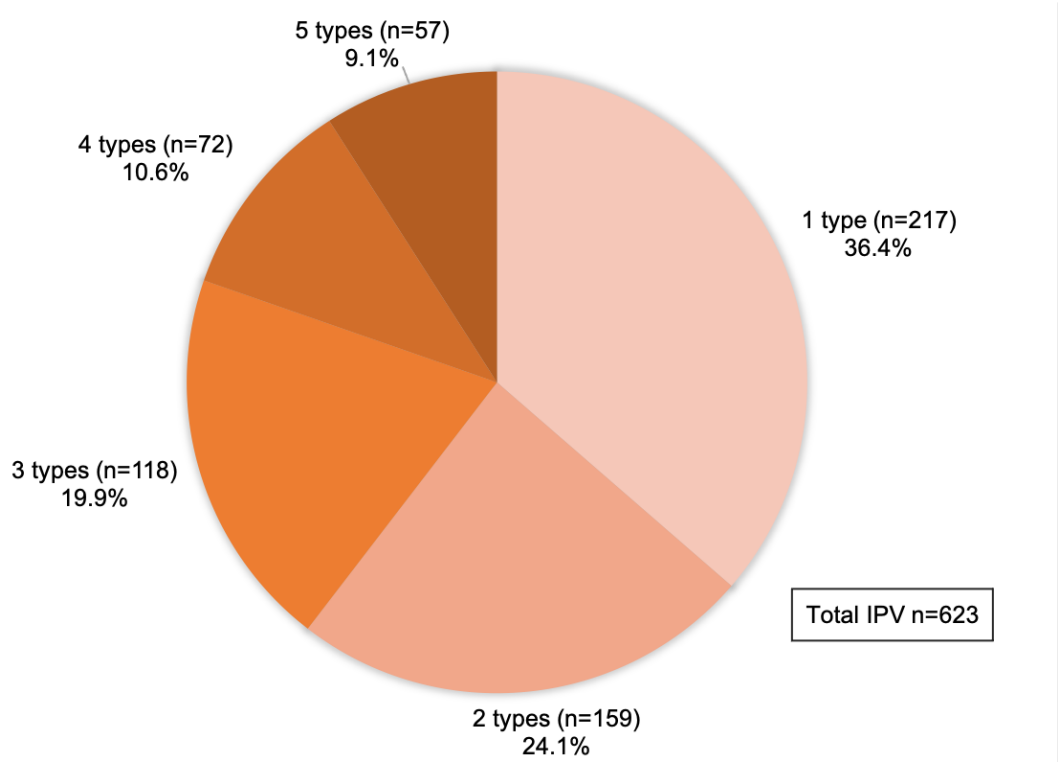
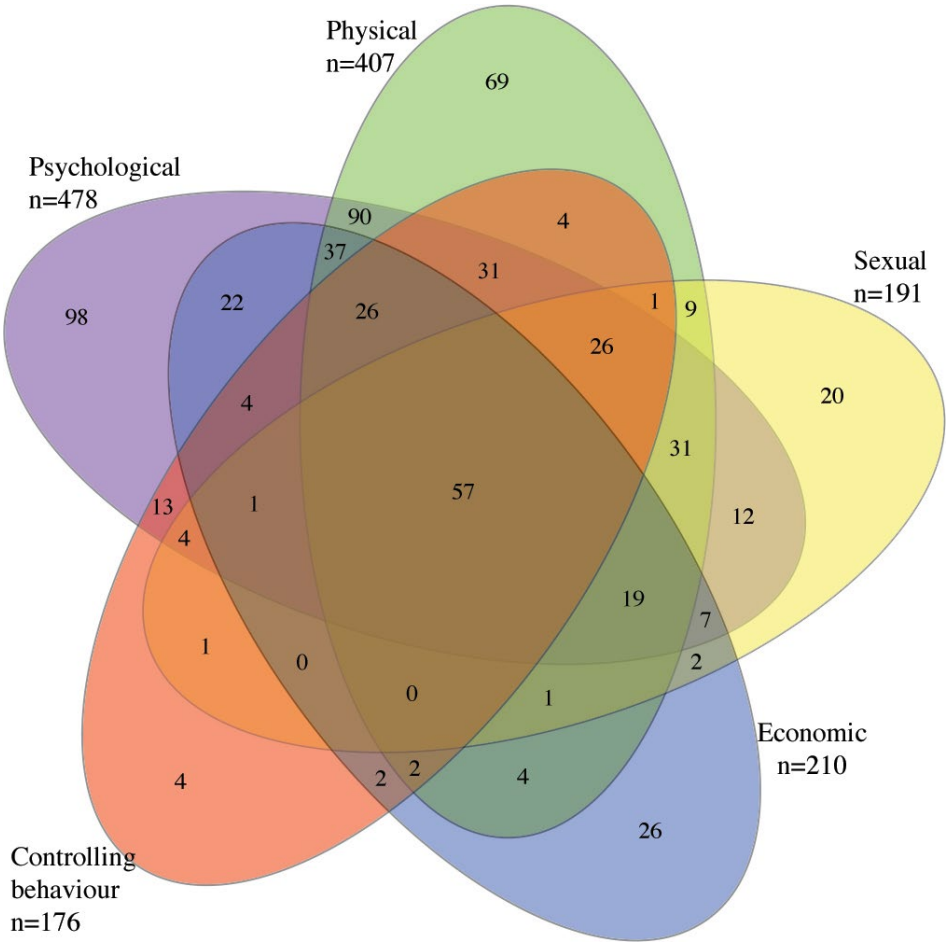


Figure 7.2 illustrates the complex interrelationship between experience of IPV exposure types in for women who reported any IPV in the sample, with many types overlapping in various combinations. Further, Figure 7.2 shows that sexual IPV, economic abuse and controlling behaviour almost always co-occurred with other types of IPV.

Figure 7.2.
Distribution of IPV Types Experienced Among Women Who Reported Any IPV



7.1.5. Prevalence of health outcomes in the sample and across sociodemographic sub-populations

Overall, 23% [20.6-25.6] of women in the sample reported poor self-rated general health, and one third (33.2% [30.4-36.1]) had consulted a healthcare professional in the four weeks prior to the survey. In the four weeks prior to the survey, almost one third (30.6% [27.5-33.8]) had experienced pain or discomfort, 56.7% [53.6-59.7] had taken medication for pain or discomfort, and 15.9% [13.9-18.0] had taken pain medication frequently. Almost half (46.9% [43.6-50.2]) of ever-partnered women had been diagnosed with a chronic health condition and 21.9% [19.4-24.7] had been diagnosed with a mental health condition.

As presented in Table 7.3, bivariate analyses found that chronic health conditions were more prevalent in older age groups (59.2% [54.9-63.3] of women aged 50-69, and 74.1% [67.5-79.8] of women aged

over 70 years), confirming the need to adjust for age in multivariable analyses. Similarly, older age groups were more likely to consult a healthcare professional, experience and medicate for recent pain or discomfort, and frequently medicate for pain or discomfort than younger age groups. Māori and Pacific women were over twice (OR 2.26 [1.24-4.86], OR 2.45 [1.24-4.86]; respectively) as likely to have poor self-rated general health than European women. Asian women were less likely to experience most physical health outcomes, particularly diagnosis of a physical (OR 0.23 [0.15-0.36]) or mental (OR 0.34 [0.19-0.61]) health condition, compared with European women.

Women with a tertiary education had significantly lower odds of being diagnosed with a chronic physical health condition (OR 0.57 [0.44-0.74]), have poor self-rated general health (OR 0.61 [0.46-0.83]), and frequently take pain medication (OR 0.6 [0.43-0.83]) than women who had primary or secondary schooling qualifications. Women who reported experiencing food insecurity were found to have significantly greater odds of experiencing poor general health (OR 3.8 [2.76-5.25]), being diagnosed with a mental health condition (OR 1.83 [1.32-2.54]), and frequently taking pain medication (OR 1.98 [1.43-2.76]) than those who were food secure. Women who were not working were more likely to report diagnosis of a physical health condition (OR 4.30 [1.99-9.30]), poor self-rated health (OR 3.04 [1.29-7.13]), recent pain or discomfort (OR 4.23 [1.71-10.45]), and over four times as likely to frequently take pain medication (OR 4.35 [1.43-13.2]). Compared with students, retired women were nine times (OR 9.0 [4.46-18.3]) more likely to experience a diagnosis of a chronic physical health condition, four times (OR 4.01 [1.79-8.96]) more likely to recently experience pain or discomfort, almost twice (OR 1.88 [1.00-3.50], p=0.049) as likely to take medication for pain or discomfort, and over five times likely (OR 5.73 [2.08-15.82]) to do so frequently. However, these unadjusted odds ratios are likely to reflect differences across age groups.

Table 7.3.

Prevalence and Bivariate Odds Ratios for the Association Between Sociodemographic Characteristics and Health Outcomes Reported by Ever-Partnered Women in the 2019 NZFVS

	n (W%)	Poor general health	Recent pain or discomfort	Recent pain medication	Frequent pain medication	Recent healthcare consultation	Any physical health condition	Any mental health condition
n (W%)	1431 (100)	330 (23.0)	443 (30.6)	816 (56.7)	247 (15.9)	496 (33.2)	685 (46.9)	322 (21.9)
					OR (W%)			
Age group								
16-29	156 (14.7)	Ref. (28.8)	Ref. (18.9)	Ref. (44.1)	Ref. (6.3)	Ref. (24.8)	Ref. (23.2)	Ref. (23.3)
30-49	474 (33.8)	0.84 [0.53-1.34] (21.6)	1.47 [0.84-2.57] (25.6)	**1.81 [1.18-2.76]** (58.7)	1.70 [0.87-3.33] (10.3)	1.27 [0.80-2.00] (29.5)	1.56 [0.92-2.65] (32.0)	1.00 [0.62-1.63] (23.3)
50-69	547 (36.7)	0.91 [0.58-1.45] (23.2)	**2.42 [1.51-3.90]** (36.1)	**1.89 [1.17-2.83]** (59.8)	**3.87 [1.97-7.61]** (20.7)	**1.68 [1.04-2.70]** (35.6)	**4.79 [2.99-7.64]** (59.2)	0.97 [0.61-1.53] (22.7)
70+	252 (14.8)	0.95 [0.56-1.62] (23.9)	**2.90 [1.72-4.89]** (40.3)	**1.69 [1.10-2.60]** (57.1)	**5.30 [2.59-10.84]** (26.3)	**2.41 [1.48-3.93]** (44.3)	**9.46 [5.36-16.7]** (74.1)	0.61 [0.36-1.05] (15.7)
Ethnicity								
European	1006 (65.1)	Ref. (19.1)	Ref. (32.5)	Ref. (59.9)	Ref. (16.4)	Ref. (36.2)	Ref. (50.8)	Ref. (24.5)
Māori	183 (14.4)	**2.26 [1.24-4.86]** (34.8)	0.96 [0.65-1.42] (31.7)	0.87 [0.60-1.27] (56.7)	1.18 [0.80-1.74] (18.9)	0.86 [0.59-1.25] (32.7)	0.93 [0.63-1.36] (49.0)	1.23 [0.81-1.86] (28.5)
Pacific	66 (7.4)	**2.45 [1.24-4.86]** (36.7)	0.99 [0.32-3.07] (32.3)	0.76 [0.34-1.70] (53.1)	1.05 [0.47-2.37] (17.2)	**0.47 [0.23-0.95]** (21.1)	1.28 [0.56-2.92] (57.0)	**0.26 [0.11-0.63]** (7.8)
Asian	152 (11.6)	1.12 [0.74-1.72] (21.0)	**0.44 [0.28-0.70]** (17.5)	**0.49 [0.35-0.70]** (42.4)	**0.44 [0.24-0.81]** (8.0)	**0.56 [0.36-0.87]** (24.0)	**0.23 [0.15-0.36]** (19.4)	**0.34 [0.19-0.61]** (10.0)

	n (W%)	Poor general health	Recent pain or discomfort	Recent pain medication	Frequent pain medication	Recent healthcare consultation	Any physical health condition	Any mental health condition
MELAA	22 (1.4)	1.49 [0.55-4.02] (26.1)	0.91 [0.36-2.31] (30.6)	0.51 [0.21-1.27] (43.5)	1.02 [0.33-3.15] (16.7)	1.14 [0.45-2.85] (39.1)	**0.19 [0.06-0.58]** (16.7)	0.28 [0.06-1.21] (8.3)
Educational attainment								
Primary/ secondary	578 (40.9)	Ref. (28.4)	Ref. (35.5)	Ref. (59.9)	Ref. (20.0)	Ref. (34.0)	Ref. (55.4)	Ref. (21.3)
Tertiary	847 (59.1)	**0.61 [0.46-0.83]** (19.5)	**0.69 [0.52-0.92]** (27.4)	0.81 [0.64-1.03] (54.8)	**0.60 [0.43-0.83]** (13.1)	0.95 [0.74-1.20] (32.7)	**0.57 [0.44-0.74]** (41.3)	1.06 [0.80-1.41] (22.3)
Food security								
Secure	1146 (79.5)	Ref. (17.5)	Ref. (29.2)	Ref. (55.7)	Ref. (13.8)	Ref. (31.9)	Ref. (46.5)	Ref. (19.6)
Insecure	279 (20.5)	**3.80 [2.76-5.25]** (44.6)	1.34 [0.97-1.85] (35.6)	1.23 [0.89-1.71] (60.8)	**1.98 [1.43-2.76]** (24.1)	1.32 [0.97-1.79] (38.2)	1.09 [0.82-1.47] (48.7)	**1.83 [1.32-2.54]** (30.9)
Employment status								
Student	61 (6.2)	Ref. (19.8)	Ref. (14.2)	Ref. (43.4)	Ref. (5.6)	Ref. (30.2)	Ref. (20.6)	Ref. (19.6)
Not working	90 (6.5)	**3.04 [1.29-7.13]** (42.9)	**4.23 [1.71-10.45]** (41.1)	1.21 [0.60-2.47] (48.2)	**4.35 [1.43-13.2]** (20.5)	1.93 [0.88-4.24] (45.5)	**4.30 [1.99-9.30]** (52.7)	1.94 [0.86-4.37] (32.1)
Housework	146 (10.4)	1.57 [0.73-3.35] (27.9)	2.30 [0.99-5.39] (27.5)	1.69 [0.83-3.44] (56.4)	**2.99 [1.01-8.82]** (15.1)	1.05 [0.51-2.16] (31.3)	**2.66 [1.22-5.79]** (40.8)	0.79 [0.38-1.66] (16.2)
Retired	355 (21.6)	1.31 [0.64-2.68] (24.4)	**4.01 [1.79-8.96]** (39.8)	**1.88 [1.00-3.50]** (59.0)	**5.73 [2.08-15.82]** (25.4)	1.53 [0.77-3.04] (39.8)	**9.0 [4.46-18.3]** (70.1)	1.03 [0.52-2.03] (20.1)
Employed	778 (55.3)	0.99 [0.49-1.98] (19.6)	**2.38 [1.08-5.22]** (28.2)	**1.83 [1.00-3.34]** (58.4)	2.49 [0.92-6.70] (12.9)	0.98 [0.50-1.93] (29.8)	**2.72 [1.38-5.38]** (41.3)	1.21 [0.62-2.38] (22.8)

Note. Bold font indicates significant result at $p < 0.05$. Square brackets present 95% confidence intervals for odds ratios.

W = Weighted percentage; n = number of participants; OR = unadjusted odds ratio; MELAA = Middle Eastern/Latin American/African

7.2. Association Between Lifetime IPV Exposure and Health Outcomes

7.2.1. Any IPV

Bivariate logistic regression analyses produced strong associations between exposure to any lifetime IPV and all seven health outcomes. Significant associations persisted after adjustment for sociodemographic factors for five of the health outcomes. Table 7.4 presents the full unadjusted bivariate and adjusted multivariable odds ratios of associations between any IPV and the health outcomes explored in this study.

Table 7.4.
Odds Ratios for the Association Between Exposure to Any Lifetime IPV and Health Outcomes

	Poor general health		**Recent pain or discomfort**		**Recent pain medication**		**Frequent pain medication**	
	OR	**AOR**	**OR**	**AOR**	**OR**	**AOR**	**OR**	**AOR**
No IPV	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Any IPV	**2.00 [1.52-2.64]**	**1.79 [1.30-2.47]**	**1.78 [1.33-2.38]**	**1.75 [1.33-2.30]**	**1.35 [1.07-1.71]**	1.24 [0.98-1.56]	**1.44 [1.09-1.91]**	1.31 [0.97-1.78]

	Recent healthcare consultation		**Any physical health condition**		**Any mental health condition**	
	OR	**AOR**	**OR**	**AOR**	**OR**	**AOR**
No IPV	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Any IPV	**1.45 [1.14-1.85]**	**1.38 [1.08-1.76]**	**1.37 [1.07-1.75]**	**1.43 [1.12-1.85]**	**3.31 [2.44-4.47]**	**2.74 [2.03-3.71]**

Note. Bold font indicates significant result at $p < 0.05$.

AORs adjusted for age, ethnicity, food security, employment status, education

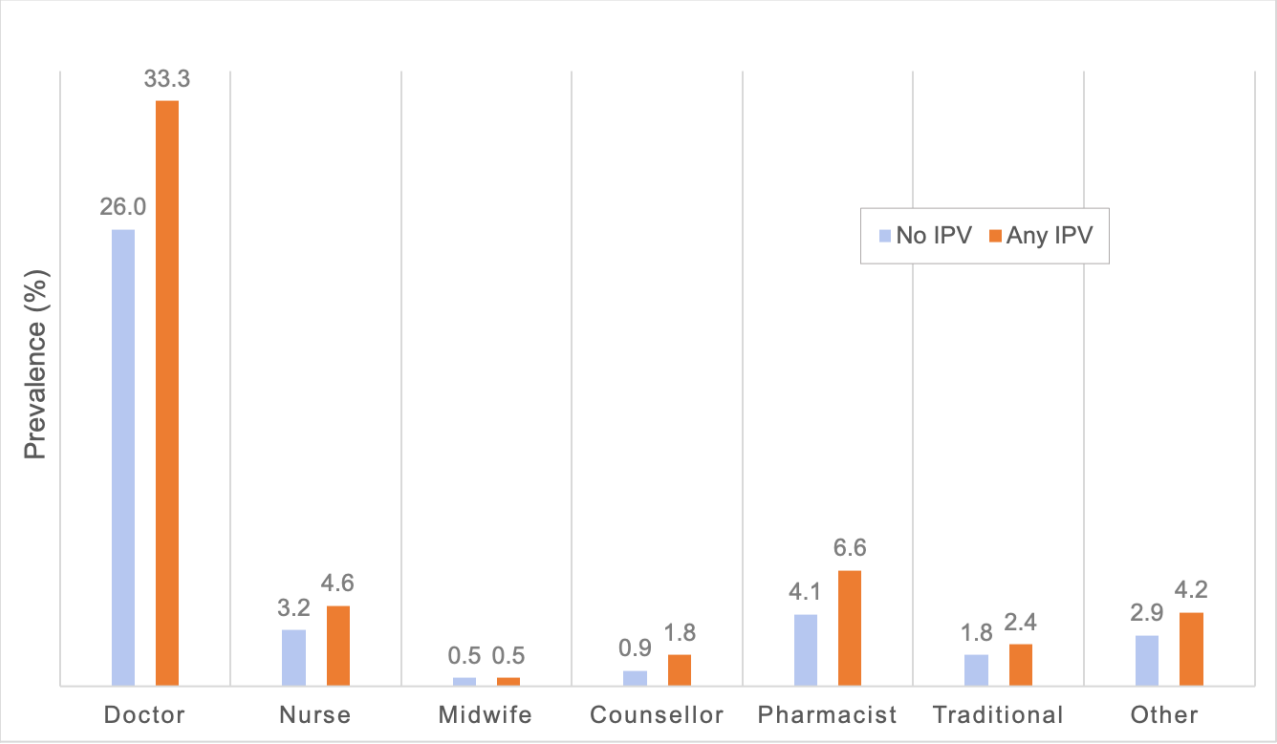
7.2.1.1. Poor general health. Those exposed to any lifetime IPV had a higher proportion of poor self-rated general health, with a prevalence of 30.0% [26.2-34.2] compared to 17.7% [14.9-20.8] for those not exposed to IPV. After adjustment for sociodemographic factors, association between exposure to any IPV and poor general health remained significant (AOR 1.79 [1.30-2.47]).

7.2.1.2. Pain or discomfort. Almost forty percent (37.7% [33.8-41.8]) of respondents who had experienced any lifetime IPV reported experiencing pain or discomfort in the four weeks prior to the survey, compared with 25.4% [21.0-30.4] of women not exposed to IPV. Similarly, 60.9% [56.6-65.0] of women who reported IPV exposure took medication to relieve pain in this period, compared with 53.5% [49.3-57.7] of unexposed respondents. Further, 18.5% [15.8-21.7] of women with any IPV exposure took pain medication frequently, compared with 13.7% [11.3-16.5] of unexposed women.

At the bivariate stage, any IPV was associated with significant increased risk for all three pain-related outcomes. After adjustment for sociodemographic factors, reporting experience of pain or discomfort in the four weeks prior to the survey retained significance and was associated with an increased risk (AOR 1.75 [1.33-2.30]), with the other two pain-related outcomes closely missing significance.

7.2.1.3. Recent healthcare consultation. Figure 7.3 shows that women exposed to any lifetime IPV had greater prevalence for consulting with all types of healthcare professionals in the four weeks prior to the survey, compared with women with no IPV exposure. The binary measure found that almost 40% (39.7% [34.0-42.0]) of those who had experienced any IPV had recently consulted at least one healthcare professional, compared with 29.6% [25.9-33.5] of women not exposed to IPV.

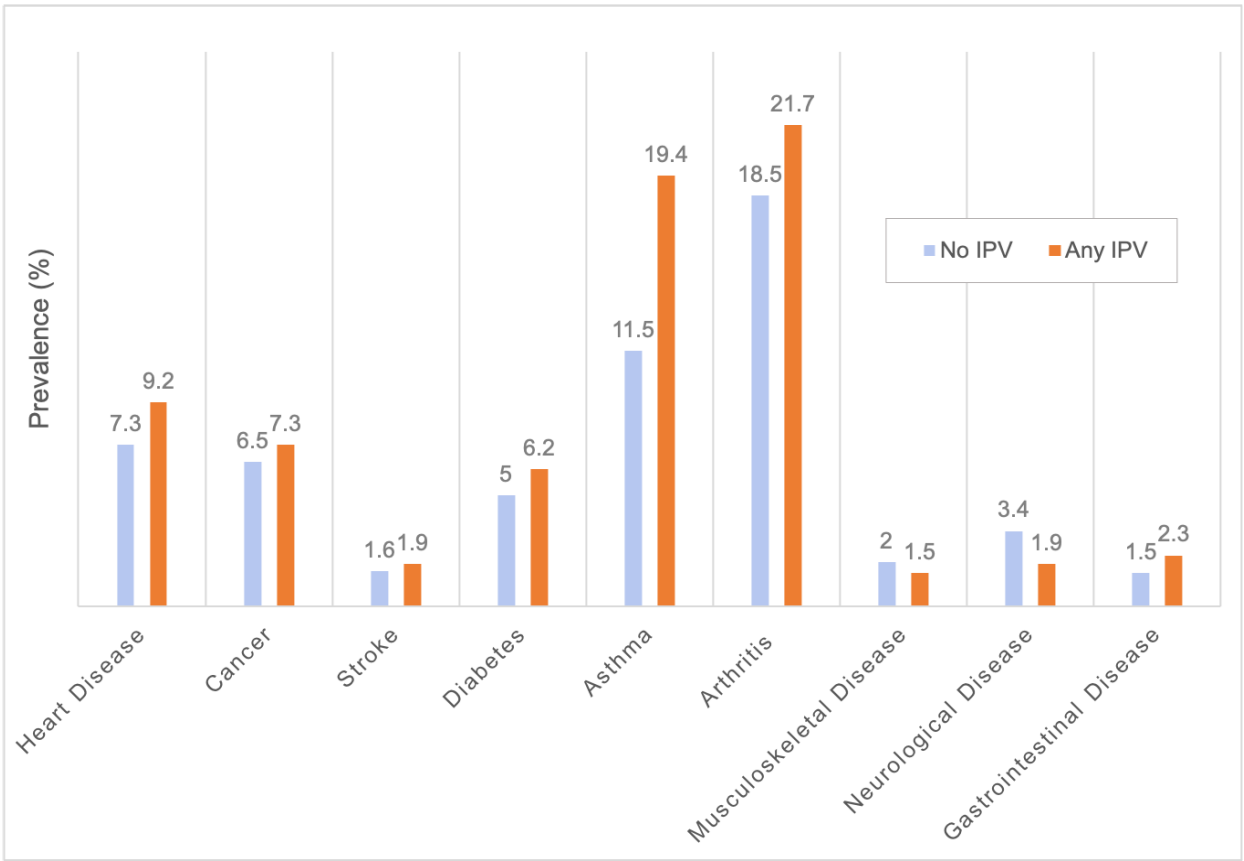
Figure 7.2.
Prevalence for Types of Healthcare Professional Recently Consulted by IPV Exposure



Exposure to any lifetime IPV was associated with increased odds (AOR 1.38 [1.08-1.76]) of having recently consulted a healthcare professional in the four weeks prior to the survey. Although not included in the reported analyses, of the fourteen respondents who indicated that they needed to consult a healthcare professional in the four weeks prior to the survey but had not due to cost or transport barriers, twelve had experienced IPV in their lifetime.

7.2.1.4. Any physical health condition. Figure 7.4 shows the prevalence of each physical health condition reported by those exposed to lifetime IPV and those with no IPV exposure. Conditions which were reported by less than 1% of the sample were excluded from this graph. This included ENT, ophthalmology, genitourinary, respiratory and metabolic diseases. It can be seen that women exposed to IPV had higher proportions of almost all physical health conditions, with the greatest difference observed for asthma.

Figure 7.4.
Prevalence of Diagnosed Physical Health Conditions by IPV Exposure

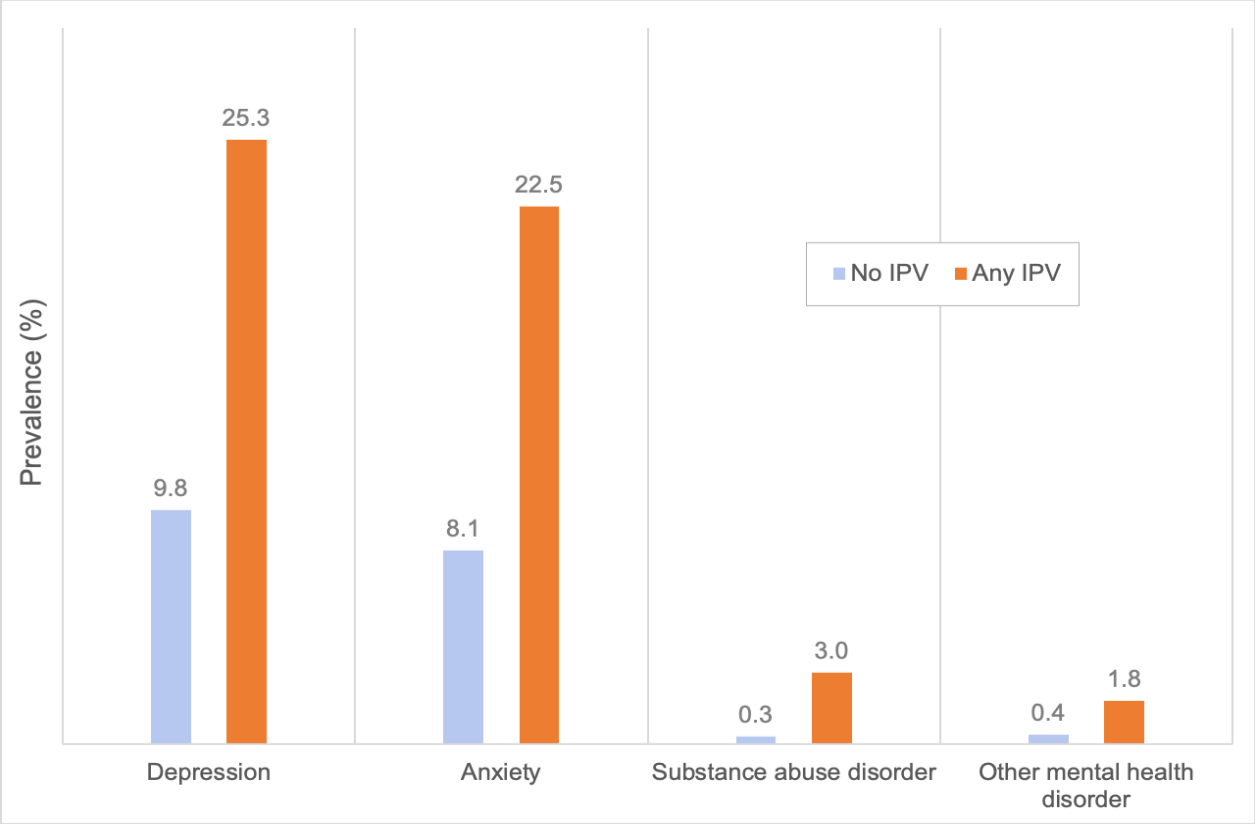


Overall, half (51.3%) of women who had been exposed to any IPV in their lifetime reported having a diagnosed physical health condition, compared with 43.5% of women who had not experienced IPV.

After adjusting for sociodemographic factors, exposure to any lifetime IPV remained significantly associated (AOR 1.43 [1.12-1.85]) with increased risk of having a diagnosed physical health condition.

7.2.1.5. Mental health condition. Figure 7.5 illustrates that IPV exposure was associated with an at least two-fold higher prevalence in depression, anxiety, substance abuse disorder and other mental health disorders, compared with those not exposed to IPV.

Figure 7.5.
Prevalence of Diagnosed Mental Health Conditions by IPV Exposure



Using the aggregate measure, the weighted proportion of women exposed to IPV reporting having a mental health condition was 33.6% [29.4-38.1], compared with 13.3% [10.8-16.2] for unexposed women. After adjustment for sociodemographic factors, reporting any lifetime IPV was associated with increased risk of having a diagnosed mental health condition (AOR 2.74 [2.03-3.71]).

7.2.2. IPV severity

Table 7.5 shows that severe physical IPV was associated with increased likelihood of experiencing all health outcomes in bivariate and multivariable analyses, aside from the association with recently

consulting a healthcare professional which dropped out of significance after adjustment for sociodemographic factors. Exposure to any physical IPV was associated with all seven health outcomes during both bivariate and multivariable analyses. However, moderate physical IPV failed to retain statistically significant associations with health outcomes after adjustment for sociodemographic factors, aside from diagnosis of a mental health condition which produced an adjusted odds ratio of 2.47 [1.68-3.63].

Table 7.5.

Odds Ratios for the Association Between Exposure to Moderate and Severe Physical IPV and Health Outcomes

	Poor general health		**Recent pain/ discomfort**		**Recent pain medication**		**Frequent pain medication**		**Recent healthcare consultation**		**Any physical health condition**		**Any mental health condition**	
	OR	**AOR**	**OR**	**AOR**	**OR**	**AOR**	**OR**	**AOR**	**OR**	**AOR**	**OR**	**AOR**	**OR**	**AOR**
No IPV	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Moderate physical IPV	**1.57 [1.07-2.29]**	1.36 [0.89-2.08]	1.25 [0.86-1.80]	1.21 [0.82-1.78]	1.02 [0.71-1.45]	0.95 [0.66-1.37]	1.20 [0.79-1.81]	1.17 [0.75-1.83]	1.36 [0.94-1.95]	1.30 [0.89-1.90]	0.97 [0.68-1.37]	1.01 [0.70-1.45]	**2.85 [1.97-4.14]**	**2.47 [1.68-3.63]**
Severe physical IPV	**2.02 [1.50-2.71]**	**1.54 [1.10-2.16]**	**2.18 [1.59-2.99]**	**2.05 [1.48-2.85]**	**1.90 [1.37-2.64]**	**1.82 [1.30-2.54]**	**1.98 [1.40-2.80]**	**1.67 [1.14-2.44]**	**1.37 [1.01-1.85]**	1.28 [0.93-1.78]	**1.70 [1.24-2.32]**	**1.63 [1.15-2.31]**	**2.25 [1.63-3.11]**	**1.92 [1.34-2.74]**
Any physical IPV	**2.08 [1.60-2.70]**	**1.63 [1.19-2.24]**	**1.91 [1.45-2.51]**	**1.84 [1.40-2.43]**	**1.53 [1.18-1.99]**	**1.45 [1.11-1.89]**	**1.80 [1.31-2.46]**	**1.60 [1.13-2.27]**	**1.45 [1.13-1.87]**	**1.38 [1.06-1.80]**	**1.40 [1.06-1.84]**	**1.40 [1.04-1.87]**	**3.17 [2.38-4.23]**	**2.77 [2.04-3.75]**

Note. Bold font indicates significant result at p <0.05. Square brackets present 95% confidence intervals.

AORs adjusted for age, ethnicity, food security, employment status, education

7.2.3. IPV type

All specific types of IPV had a number of significant bivariate associations with health outcomes. Physical IPV, psychological IPV, and controlling behaviours were associated with all seven health outcomes at the bivariate level. After multivariable adjustment, strong associations persisted between exposure to physical IPV and controlling behaviours and all seven health outcomes, while associations between other IPV types did not reach significance for all health outcomes. Table 7.6 presents the full unadjusted bivariate and adjusted multivariable odds ratios of associations between IPV types and the health outcomes explored in this study.

7.2.3.1. Any physical IPV. Exposure to any physical IPV was associated with increased risk for all seven health outcomes. Any physical IPV had the greatest increased risk of reporting poor general health (AOR 1.63 [1.19-2.24]) compared with the other five specific types. Experience of any physical IPV was one of the three types significantly associated with consulting healthcare in the four weeks prior to the survey (AOR 1.38 [1.06-1.80]), and was also associated with a near three-fold increased risk of reporting a diagnosis of a mental health condition (AOR 2.77 [2.04-3.75]).

7.2.3.2. Sexual IPV. Exposure to sexual IPV was associated with increased risk for all three pain-related outcomes. Women who reported exposure to sexual IPV had increased likelihood of reporting experiencing pain or discomfort (AOR 1.81 [1.28-2.55]), increased odds of recently taking pain medication (AOR 1.50 [1.06-2.11]), and for taking pain medication frequently (AOR 1.60 [1.07-2.39]) in the four weeks prior to the survey. Experience of sexual IPV was also associated with a two-fold increased risk of reporting a diagnosis of a mental health condition (AOR 2.02 [1.37-2.98]). However, sexual IPV did not retain statistical significance after adjustment for sociodemographic factors with poor general health, recent healthcare consultation, or diagnosis of any physical health condition.

7.2.3.3. Psychological IPV. Psychological IPV was significantly associated all seven health outcomes in the bivariate stage; associations with frequent pain medication use and recently consulting healthcare dropped out of significance after adjustment for sociodemographic factors. Psychological IPV was associated with a two-fold increased risk of reporting experience of pain or discomfort (AOR 1.97 [1.48-2.62]) in the four weeks prior to the survey.

7.2.3.4. Controlling behaviours. Controlling behaviours was consistently associated with all seven health outcomes, which persisted after adjustment for sociodemographic factors. Compared with the other five types, exposure to controlling behaviours was associated with greatest risk for any physical

health condition (AOR 1.69 [1.14-2.49]), frequent use of pain medication (AOR 1.66 [1.05-2.63]), and recent healthcare consultation (AOR 1.71 [1.13-2.58]).

7.2.3.5. Economic Abuse. In terms of physical health outcomes, exposure to economic IPV was significantly associated with reporting recent pain or discomfort (AOR 1.59 [1.12-2.25]) and having a diagnosis of any physical health condition (AOR 1.53 [1.07-2.20]). Compared with the other five types, economic abuse was associated with the greatest increased odds of having a diagnosis of a mental health condition (AOR 2.91 [2.03-4.16]). Associations with the other four health outcomes either did not meet significance at the bivariate stage, or dropped out of significance after adjustment for sociodemographic factors.

Table 7.6.

Odds Ratios for the Association Between Exposure to IPV by Type and Health Outcomes

	Poor general health		Recent pain/ discomfort		Recent pain medication		Frequent pain medication		Recent healthcare consultation		Any physical health condition		Any mental health condition	
	OR	**AOR**	**OR**	**AOR**	**OR**	**AOR**	**OR**	**AOR**	**OR**	**AOR**	**OR**	**AOR**	**OR**	**AOR**
No IPV	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Any physical IPV	**2.08 [1.60-2.70]**	**1.63 [1.19-2.24]**	**1.91 [1.45-2.51]**	**1.84 [1.40-2.43]**	**1.53 [1.18-1.99]**	**1.45 [1.11-1.89]**	**1.80 [1.31-2.46]**	**1.60 [1.13-2.27]**	**1.45 [1.13-1.87]**	**1.38 [1.06-1.80]**	**1.40 [1.06-1.84]**	**1.40 [1.04-1.87]**	**3.17 [2.38-4.23]**	**2.77 [2.04-3.75]**
Sexual IPV	**1.74 [1.23-2.44]**	1.42 [0.97-2.08]	**1.88 [1.33-2.65]**	**1.81 [1.28-2.55]**	**1.64 [1.17-2.30]**	**1.50 [1.06-2.11]**	**1.78 [1.22-2.59]**	**1.60 [1.07-2.39]**	**1.52 [1.08-2.15]**	1.42 [0.99-2.02]	1.30 [0.92-1.84]	1.27 [0.88-1.85]	**2.32 [1.58-3.40]**	**2.02 [1.37-2.98]**
Psych. IPV	**1.72 [1.32-2.24]**	**1.55 [1.12-2.13]**	**1.94 [1.45-2.59]**	**1.97 [1.48-2.62]**	**1.62 [1.41-2.23]**	**1.53 [1.18-1.98]**	**1.51 [1.14-2.00]**	1.30 [0.94-1.80]	**1.39 [1.08-1.79]**	1.30 [1.00-1.70]	**1.28 [1.00-1.64]**	**1.36 [1.05-1.76]**	**2.75 [2.07-3.65]**	**2.23 [1.67-2.97]**
CB	**2.07 [1.42-3.00]**	**1.60 [1.03-2.47]**	**1.73 [1.19-2.54]**	**1.75 [1.14-2.66]**	**1.58 [1.10-2.27]**	**1.50 [1.01-2.23]**	**1.77 [1.20-2.60]**	**1.66 [1.05-2.63]**	**1.64 [1.13-2.40]**	**1.71 [1.13-2.58]**	**1.57 [1.10-2.22]**	**1.69 [1.14-2.49]**	**2.21 [1.51-3.24]**	**1.90 [1.26-2.88]**
Economic abuse	**1.69 [1.22-2.40]**	1.31 [0.89-1.92]	**1.65 [1.16-2.36]**	**1.59 [1.12-2.25]**	1.31 [0.95-1.81]	1.26 [0.92-1.74]	**1.65 [1.12-2.42]**	1.36 [0.90-2.07]	**1.47 [1.06-2.03]**	1.33 [0.94-1.88]	**1.57 [1.12-2.20]**	**1.53 [1.07-2.20]**	**2.92 [2.07-4.11]**	**2.91 [2.03-4.16]**
Any IPV	**2.00 [1.52-2.64]**	**1.79 [1.30-2.47]**	**1.78 [1.33-2.38]**	**1.75 [1.33-2.30]**	**1.35 [1.07-1.71]**	1.24 [0.98-1.56]	**1.44 [1.09-1.91]**	1.31 [0.97-1.78]	**1.45 [1.14-1.85]**	**1.38 [1.08-1.76]**	**1.37 [1.07-1.75]**	**1.43 [1.12-1.85]**	**3.31 [2.44-4.47]**	**2.74 [2.03-3.71]**

Note. Bold font indicates significant results at p <0.05. Square brackets present 95% confidence intervals.

AORs adjusted for age, ethnicity, food security, employment status, education. Psych. = psychological; CB = controlling behaviours

7.2.4. Multiple types of IPV experienced

7.2.4.1. Number of IPV types. Table 7.7 presents the association between number of any types of IPV experienced and health outcomes. A cumulative effect was observed, which persisted after adjustment for sociodemographic factors.

Exposure to four or five IPV types was significantly associated with all health outcomes, including diagnosis of any physical health condition (AOR 2.21 [1.34-3.36]), recent healthcare consultation (AOR 1.98 [1.26-3.11]), and frequent use of pain medication (AOR 1.84 [1.11-3.03]. These associations were not significant for women who had been exposed to three or fewer IPV types.

All counts of IPV exposure were significantly associated with increased odds of reporting poor general health across bivariate and multivariable analyses, compared with those not exposed to IPV. All counts of IPV types were significantly associated with increased odds of reporting any mental health condition across bivariate and multivariable analyses. Exposure to four or five types of IPV produced an almost four-fold (AOR 3.89 [2.39-6.35]) increase in the risk of reporting a diagnosis of a mental health condition.

Women who had experienced two or more types of IPV had increased odds of experiencing pain or discomfort in the four weeks prior to the survey, with odds increasing with exposure to additional types of IPV (2 types AOR 1.82 [1.17-2.84]; 3 types AOR 2.04 [1.25-3.35]; 4 or 5 types AOR 2.54 [1.62-4.01]).

Table 7.7.

Odds Ratios for the Association Between Number of IPV Types Experienced and Health Outcomes

		Poor general health		Recent pain or discomfort		Recent pain medication		Frequent pain medication		Recent healthcare consultation		Any physical health condition		Any mental health condition	
	n (W%)	**OR**	**AOR**	**OR**	**AOR**	**OR**	**AOR**	**OR**	**AOR**	**OR**	**AOR**	**OR**	**AOR**	**OR**	**AOR**
No IPV	798 (57.0)	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
1 type	217 (15.6)	**1.58 [1.05-2.37]**	**1.58 [1.02-2.44]**	1.31 [0.87-1.98]	1.31 [0.88-1.94]	0.97 [0.69-1.36]	0.91 [0.65-1.28]	0.98 [0.64-1.49]	0.96 [0.62-1.47]	1.36 [0.97-1.93]	1.32 [0.95-1.85]	1.29 [0.93-1.78]	1.37 [0.99-1.90]	**2.58 [1.69-3.93]**	**2.19 [1.43-3.36]**
2 types	159 (10.4)	**2.10 [1.36-3.26]**	**2.16 [1.33-3.49]**	**1.88 [1.21-2.90]**	**1.82 [1.17-2.84]**	1.30 [0.88-1.91]	1.17 [0.79-1.72]	1.39 [0.87-2.21]	1.25 [0.74-2.11]	1.25 [0.83-1.89]	1.17 [0.77-1.79]	1.24 [0.85-1.80]	1.21 [0.83-1.76]	**3.68 [2.40-5.63]**	**2.93 [1.93-4.46]**
3 types	118 (8.6)	**2.28 [1.48-3.54]**	**1.79 [1.05-3.06]**	**1.94 [1.22-3.08]**	**2.04 [1.25-3.35]**	**2.15 [1.31-3.52]**	**2.03 [1.24-3.33]**	**1.69 [1.03-2.77]**	1.71 [0.99-2.97]	1.32 [0.83-2.09]	1.29 [0.80-2.10]	1.12 [0.72-1.74]	1.37 [0.81-2.30]	**3.27 [2.07-5.17]**	**2.80 [1.74-4.53]**
4 or 5 types	129 (8.4)	**2.48 [1.60-3.86]**	**1.82 [1.10-2.99]**	**2.59 [1.66-4.06]**	**2.54 [1.62-4.01]**	**1.74 [1.15-2.61]**	**1.61 [1.05-2.46]**	**2.24 [1.44-3.50]**	**1.84 [1.11-3.03]**	**2.13 [1.42-3.19]**	**1.98 [1.26-3.11]**	**2.12 [1.38-3.27]**	**2.12 [1.34-3.36]**	**4.49 [2.79-7.23]**	**3.89 [2.39-6.35]**

Note. Bold font indicates significant results at $p < 0.05$. Square brackets present 95% confidence intervals.

AORs adjusted for age, ethnicity, food security, employment status, education

7.4.2.2. Combinations of IPV types. An incremental model was used to explore the associations of specific combinations of IPV on health outcomes. Justification for this incremental model, including the decision to collapse controlling behaviours and economic abuse, is provided in Chapter 6. Figure 7.6 illustrates the three-way intersection and frequency of exposure to psychological, physical, and sexual IPV among women who reported exposure to any IPV. Exclusive exposure to psychological IPV (category 1) was the first group, followed by combined exposure to psychological IPV and physical IPV (category 2). The third group (category 3) included respondents who had experienced all psychological, physical and sexual IPV types.

Figure 7.6.
Distribution of Psychological, Physical and Sexual IPV Types Experienced Among Women Who Reported Any IPV, for the Purposes of the Incremental Model

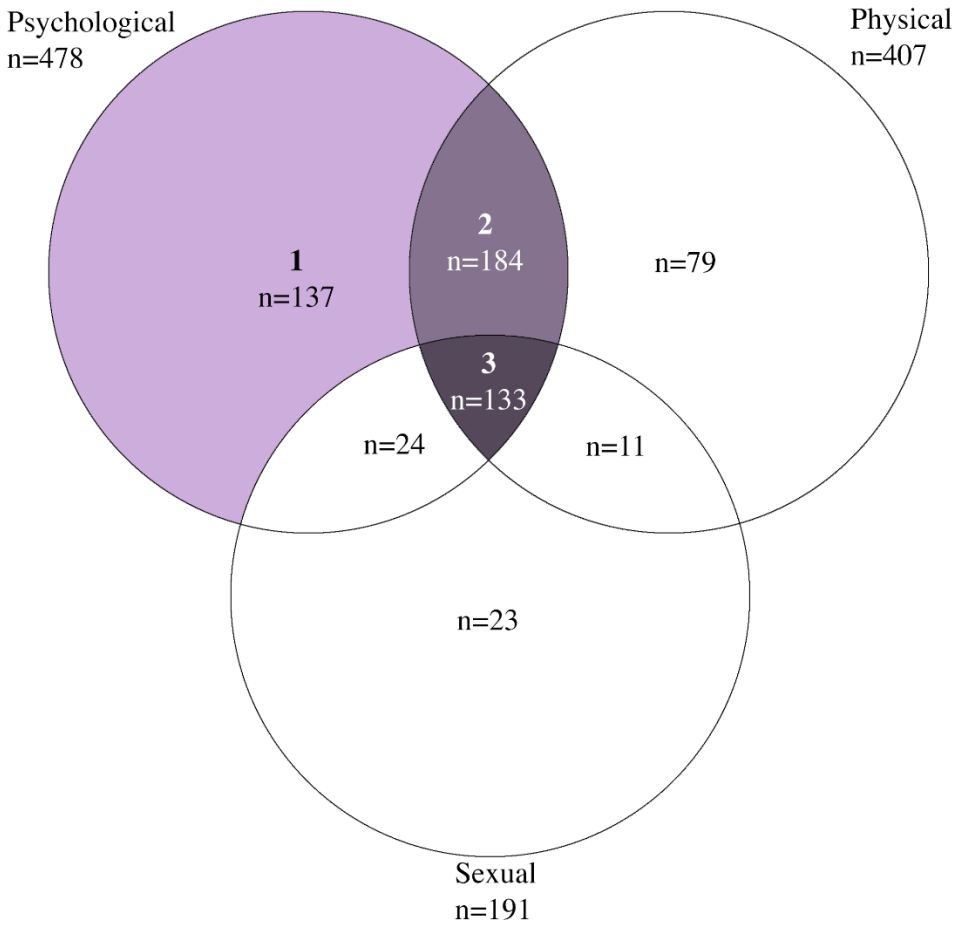


Table 7.8 presents bivariate and multivariate logistic regression analyses for the selected combinations of IPV types, illustrating an incremental association with observed effects. The only physical health outcome significantly associated with exposure to psychological IPV only was for reporting recent pain or discomfort (AOR 1.76 [1.13-2.73]). Exposure to psychological IPV only produced an almost two-fold (AOR 1.91 [1.23-2.96]) increase in the odds of being diagnosed with a mental health condition.

Combined exposure to both psychological and physical IPV had the greatest prevalence (12.8%) of the exposure increments. Significant associations were found between exposure to both psychological and physical IPV and poor general health (AOR 1.56 [1.04-2.34]), diagnosis of a mental health condition (AOR 2.05 [1.39-3.03]), recently experiencing pain or discomfort (AOR 1.95 [1.33-2.87]), and recently taking medication for pain or discomfort (AOR 1.66 [1.13-2.45]). After adjustment for sociodemographic factors, the association between exposure to psychological and physical IPV and diagnosis of a physical health condition (AOR 1.45 [0.99-2.12]) and use of frequent pain medication narrowly failed to reach significance (AOR 1.51 [0.97-2.35]).

During bivariate analyses, the variable for exposure to psychological, physical, and sexual IPV was strongly associated with all adverse health outcomes. However, associations with the physical health condition and poor general health outcomes did not retain significance after multivariable adjustment for sociodemographic factors. Compared to those unexposed to IPV, women exposed to all psychological, physical, and sexual IPV were over three times (AOR 3.18 [1.97-5.14]) as likely to report diagnosis of a mental health condition and were almost twice (AOR 1.80 [1.13-2.85]) as likely to have consulted a healthcare professional in the four weeks prior to the survey. A strong association with pain-related health outcomes persisted, those exposed to all three types were almost three times (AOR 2.83 [1.82-4.40]) more likely to report experiencing pain or discomfort in the four weeks prior to the survey, had increased odds (AOR 1.20 [1.43-3.39]) of taking medication for pain or discomfort in this period, and were more likely to have taken pain medication frequently (AOR 1.68 [1.01-2.81]).

Table 7.8.

Odds Ratios Between the Association of Specific IPV Combinations and Health Outcomes in the Incremental Model

		Poor general health		**Recent pain or discomfort**		**Recent pain medication**		**Frequent pain medication**		**Recent healthcare consultation**		**Any physical health condition**		**Any mental health condition**	
	W%	**OR**	**AOR**	**OR**	**AOR**	**OR**	**AOR**	**OR**	**AOR**	**OR**	**AOR**	**OR**	**AOR**	**OR**	**AOR**
No IPV*	68.6	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Only Psych	9.9	1.27 [0.80-2.03]	1.48 [0.87-2.52]	**1.65 [1.07-2.56]**	**1.76 [1.13-2.73]**	1.28 [0.84-1.95]	1.23 [0.80-1.88]	0.80 [0.47-1.37]	0.82 [0.45-1.49]	1.29 [0.85-1.94]	1.21 [0.81-1.82]	1.04 [0.70-1.54]	1.14 [0.75-1.73]	**2.29 [1.49-3.54]**	**1.91 [1.23-2.96]**
Psych + Phys	12.8	**1.87 [1.33-2.64]**	**1.56 [1.04-2.34]**	**1.90 [1.30-2.77]**	**1.95 [1.33-2.87]**	**1.72 [1.17-2.53]**	**1.66 [1.13-2.45]**	**1.59 [1.06-2.39]**	1.51 [0.97-2.35]	1.17 [0.82-1.67]	1.12 [0.77-1.62]	1.32 [0.93-1.87]	1.45 [0.99-2.12]	**2.64 [1.82-3.83]**	**2.05 [1.39-3.03]**
Psych + Phys + Sexual	8.7	**1.92 [1.27-2.92]**	1.45 [0.90-2.34]	**2.84 [1.84-4.37]**	**2.83 [1.82-4.40]**	**2.26 [1.48-3.45]**	**1.20 [1.43-3.39]**	**1.97 [1.24-3.13]**	**1.68 [1.01-2.81]**	**1.96 [1.29-2.99]**	**1.80 [1.13-2.85]**	**1.56 [1.03-2.36]**	1.54 [0.98-2.43]	**3.67 [2.31-5.82]**	**3.18 [1.97-5.14]**

Note. *No IPV as defined by the categories of this model

Bold font indicates significant results at p <0.05. Square brackets present 95% confidence intervals.

AORs adjusted for age, ethnicity, food security, employment status, education. W = weighted percentages; Psych. = psychological IPV; phys. = physical IPV

Chapter 8. Discussion of the Data Analysis

8.1. Summary of Key Findings

IPV exposure was highly prevalent among ever-partnered NZ women; almost half (43%) of all women in the sample reported experiencing at least one type of IPV over their lifetime. Psychological IPV was the most prevalent type (32.9%), followed by any physical IPV (28.0%), and controlling behaviours (21.6%). The highest prevalence of IPV was reported by those who identified as Māori and those with experience of food insecurity. Increased risks for specific types of IPV were substantial; Māori women in this sample were almost three times more likely to experience severe physical IPV and controlling behaviours compared with NZ European women. Women who reported experience of food insecurity were between two to three times more likely to experience each specific type of IPV.

In addition to being common, experiences of IPV types frequently overlap. Among women who experienced any IPV, almost two-thirds (63.6%) were exposed to two or more types of IPV. One observed pattern was that sexual IPV, controlling behaviours, and economic abuse predominantly co-occurred with other types of IPV. The overlapping occurrence of individual IPV types illustrates the complexity of IPV experiences.

Seven indicators of poor self-reported health were explored in this sample of women. Twenty-three percent of all women (irrespective of IPV exposure) reported poor general health, and one third (33.2%) had consulted a healthcare professional in the four weeks prior to the survey. In this four-week period, almost one third (30.6%) had experienced pain or discomfort, 56.7% had taken medication for pain or discomfort, and 15.9% had taken pain medication frequently. Almost half (46.9%) of the women in the sample had been diagnosed with a chronic health condition and 21.9% had been diagnosed with a mental health condition. Health outcomes were more prevalent among older women (over 50 years), Māori and Pacific women, those with only primary/secondary schooling, and those who reported experiencing food insecurity.

Associations between any IPV exposure and the health outcomes were explored in this study with adjustment for sociodemographic factors. Experience of any lifetime IPV was associated with five of the assessed health outcomes (AORs ranging from 1.38 [1.08-1.76] for recently consulting a healthcare professional, to 2.74 [2.03-3.71] for having a diagnosed mental health condition).

Experience of different types of IPV were found to be associated with varying impacts on health outcomes. Women exposed to any physical IPV were significantly more likely to experience all assessed health outcomes (AORs ranged from 1.38 [1.06-1.80] for recently consulting healthcare to 2.77 [2.04-3.75] for having a diagnosed mental health condition). This increased risk seemed to largely be driven by exposure to severe physical IPV. Moderate physical IPV exposure was only significantly associated with higher risk of reporting a diagnosed mental health condition (AOR 2.47 [1.68-3.63]). Women exposed to sexual IPV were significantly more likely to experience four of the seven health outcomes assessed, with three of these comprising pain-related outcomes. These AORs were 1.81 [1.28-2.55] for experiencing pain or discomfort in the four weeks prior to the survey, and 1.50 [1.06-2.11] for taking pain medication, and 1.6 [1.07-2.39] for frequently taking pain medication in this four-week period.

Women who experienced psychological IPV were significantly more likely to report five of the seven health outcomes. Two outcomes, frequently taking pain medication and recently consulting healthcare, while significant at the bivariate level, failed to reach significance after adjustment for sociodemographic factors. Women exposed to controlling behaviours were significantly more likely to experience all seven of the explored health outcomes. AORs for these associations ranged from 1.50 [1.01-2.23] for recently taking pain medication to 1.90 [1.26-2.88] for reporting any mental health condition. Women who experienced economic abuse were significantly more likely to report three of the seven assessed health outcomes; AORs for these were 1.59 [1.12-2.25] for experiencing recent pain or discomfort, 1.53 [1.07-2.2] for reporting a diagnosed physical health condition, and a near threefold increase for reporting a diagnosed mental health condition 2.91 [2.03-4.16].

A clear cumulative pattern between number of IPV types experienced and associations with health outcomes was observed. Women who experienced one type of IPV had an increased risk of reporting two health outcomes; poor general health (AOR 1.58 [1.02-2.44]) and any mental health condition (AOR 2.19 [1.43-3.36]) compared with women who had experienced no lifetime IPV. Women exposed to two types of IPV were significantly more likely to report three health outcomes; this further increased for those exposed to three types of IPV, who were significantly more likely to report four health outcomes. Women exposed to four or five types of IPV had significantly increased odds of experiencing all health outcomes, which persisted after adjusting for sociodemographic factors. Further, as additional types of IPV were experienced the magnitude of the AORs increased. For example, AORs for experience of pain or discomfort in the four weeks prior to the survey ranged from 1.31 [0.88-1.94] (NS) for exposure to one IPV type, to 1.82 [1.17-2.84] for two types, 2.04 [1.25-3.35]

for three types, to 2.54 [1.62-4.01] for four or five types. Although other health outcomes did not present a consistently incremental increase and a few associations failed to reach statistical significance, the overall trend indicates that a cumulative or dose-response effect is present for exposure to multiple types of IPV.

The experience of specific combinations of IPV types was associated with different health outcomes. As presented in the incremental model, those who experienced only psychological IPV (not discounting controlling behaviours and economic abuse) were almost twice as likely to report recently experiencing pain or discomfort (AOR 1.76 [1.13-2.73]) and to report a diagnosis of a mental health condition (AOR 1.91 [1.23-2.96]). Combined exposure to psychological and physical IPV increased the AOR for a mental health diagnosis (AOR 2.05 [1.39-3.03]) and was also significantly associated with increased risk for reporting poor general health (AOR 1.56 [1.04-2.34]), experiencing pain or discomfort (AOR 1.95 [1.33-2.87]), and recent use of pain medication (AOR 1.66 [1.13-2.45]). Combined exposure to psychological, physical and sexual IPV was significantly associated with six of the seven health outcomes explored; association with the seventh outcome (any physical health condition) did not reach significance after adjustment for sociodemographic factors.

8.2. Comparability of IPV & Health Outcome Prevalence with Other Research

This section will compare the IPV prevalence found in the present study sample of NZ women with international literature in order to 'check' the sample and the findings against what would be expected given current knowledge, and to identify how the present findings may extend existing knowledge. Comparisons will also be drawn between the prevalence of assessed health outcomes compared with external research, in order to enhance understanding of the sample characteristics and support discussion of potential sources of bias in the limitations section. These comparisons will be presented by the parameters of prevalence of IPV, prevalence of IPV by age, prevalence of IPV by ethnicity, prevalence of exposure to multiple types of IPV, and prevalence of health outcomes.

8.2.1. Prevalence of IPV

It is difficult to compare IPV prevalence rates found in the structured literature review, as prevalence varied widely across included studies. However, the high prevalence of experiencing any type of lifetime IPV in this sample of NZ women (43.0%) is consistent with international prevalence estimates. WHO found that 37.6% of women experienced any lifetime IPV, by aggregating findings (weighted by sample size) from 3,959 international studies (WHO, 2017). Lifetime exposure to specific types of

IPV were also similar between this study and international estimates, despite variation in cultural settings and IPV measurements across studies (WHO, 2021b). WHO reported that psychological IPV was experienced by 25.7% of women (32.9% in the present sample), physical by 29.2% (28.0% in this sample) and sexual IPV by 20.5% (12.4% in this sample), and economic abuse by 12.0% of women (16.2% in this sample) (WHO, 2017). Only two of the studies identified by WHO reported on economic IPV (defined as financial abuse); the present findings are consistent with the international prevalence for this newly measured type of IPV (WHO, 2017). Of the 28.0% of women who reported exposure to any physical IPV, 58.7% reported experiencing severe physical IPV in the present study. This is slightly lower than the WHO's 2002 estimate that 70% of physically abused women experience severe IPV, which may be due to differences in cultural settings or changes over time (Krug et al., 2002).

The high prevalence of experiencing physical and/or sexual IPV in the present study (31.0%) is also comparable to earlier NZ research from the 2003 VAW Study, which found that 35% of women had been exposed to physical or sexual IPV during their lifetime (Fanslow & Robinson, 2004). The present study's IPV prevalence of 43% is significantly higher than the New Zealand Crime and Victims Survey (NZCVS), which reported ever-partnered women's lifetime prevalence of IPV at 22.9% (MOJ, 2021). However, this difference could be ascribed to the NZCVS's narrow definition of IPV as deliberate use or threats of force or violence by an intimate partner or ex-partner, and exclusion of sexual assault or harassment (MOJ, 2021). The prevalence rates of IPV in NZ as found in the present study are generally consistent with other comparable studies, and the findings here support broad estimates for the high prevalence of IPV in international and NZ settings.

8.2.2. Prevalence of IPV by age

This study has provided a more comprehensive understanding of older women's experiences of IPV, which was found to be underexplored in the literature review. For example, the original WHO MCS, and many subsequent surveys based on it, only included women up to 49 years old (García-Moreno et al., 2005; Potter et al., 2021). In addition to including older women, the present study also expanded understanding of older women's experiences of IPV by assessing lifetime exposure to IPV. It was found that older women reported higher rates of lifetime IPV than younger women; this was expected as longer lives constitute a wider timeframe for potentially experiencing IPV. Women aged 50-69 years were almost twice as likely to report having experienced severe physical IPV and economic abuse and 1.5 times more likely to have experienced any lifetime IPV, compared with women aged 16-29 years. Women aged 70+ years were *less* likely to report IPV exposures for most types (excluding

a non-significant two-times increased risk for economic abuse). This may be partly attributable to sampling methods, as those who experienced severe IPV or worse health outcomes are more likely to die early or require institutional care that would have excluded them from participation (further discussed in limitations). Further, older women may be more predisposed to recall bias, where the behaviours in question may have occurred decades ago and been forgotten or minimised. Some studies, such as Stöckl and Penhale (2015), have posited that non-physical types of abuse, including economic abuse and controlling behaviours, are more pervasive among older than younger women. However, the present study found that younger women were more likely to experience controlling behaviours than older women, which has also been found in other international research e.g., Aizpurua et al. (2021). It is important to note that the present study gathered experiences of *lifetime* IPV which makes it difficult to compare ages of *experiencing* IPV. For example, high rates of economic abuse among older women may not necessarily capture recent experiences but greater exposure earlier in life.

8.2.3. Prevalence of IPV by ethnicity

No NZ-based studies were included in the literature review that enabled comparison of prevalence by NZ's ethnic groups. Data gathered in the 2019/2020 NZCVS indicated that 41.8% of Māori women experienced sexual violence (including by non-partners) in their lifetime, compared with 39.7% of NZ European women (MOJ, 2021). Physical IPV (deliberate use or threats of force or violence) was reported by 34.2% of Māori women, compared with 24.7% of NZ European and 19.4% of Asian women (MOJ, 2021). Importantly, there is a significant discrepancy between any IPV prevalence (including sexual assault and IPV) in the NZCVS (28.9%) and the present study (43.0%) due to the previously mentioned differing definitions, therefore these comparisons should be treated with caution (MOJ, 2021). The near three-fold increased risk for Māori women to experience controlling behaviours in the present study compared with NZ European women is broadly reflected in earlier NZCVS findings, which estimated that Māori were twice as likely to experience psychological IPV and twice as likely to be a victim of coercive and controlling behaviours compared with the national average, however these findings were not reported separately by gender (MOJ, 2018). Difficulties in drawing comparisons for NZ's IPV prevalence by ethnicity further highlights the need for consistent IPV definitions to be operationalised in national surveys, and affirm the importance of the present study for presenting IPV prevalence using internationally evidenced definitions and a number of substantiated IPV factors.

8.2.4. Prevalence of exposure to multiple types of IPV

Experience of more than one type of IPV was reported in the majority of studies explored in Dillon et

al.'s (2013) literature review. However, few studies in this thesis' structured literature review explored exposure to multiple types of IPV and fewer specifically reported on the prevalence of exposure by *number* of types of IPV experienced, which means prevalence cannot be confidently compared. In one study, only 2-3% of participants up to age 65 reported experiencing all four (emotional, economic, controlling behaviours, physical/sexual) types of IPV (Stöckl & Penhale, 2015). Data from the 2003 VAW Study found that 32.7% of the full sample experienced more than one type of IPV; however this data was only presented for three types of IPV: physical, sexual and psychological (Fanslow & Robinson, 2011). In the present study, two-thirds of women who experienced IPV reported exposure to multiple types of IPV and 8.4% reported experiencing four or five types; this is consistent with other research which has suggested that singular types of abuse rarely occur without the presence of other types (Scott-Storey, 2011). This phenomenon was particularly true for sexual IPV, controlling behaviours, and economic abuse, which predominantly co-occurred with other types of IPV. These prevalence findings corroborate the statistics presented in the WHO's *Report on Violence and Health*, which stated that physical IPV is often accompanied by psychological abuse, and one-third to one-half of physical IPV cases are accompanied by sexual abuse (Krug et al., 2002). Further, the findings concur with the WHO's assertion that psychological IPV often co-occurs with acts of physical and/or sexual IPV (WHO, 2021b). This illustrates the complex profiles and patterns of IPV experiences, and highlights the necessity for comprehensive analysis of IPV types and their interrelationships.

8.2.5. Prevalence of health outcomes

In general, lack of standardisation in definitions and measures of health outcomes render it difficult to compare findings from the present sample with the general population. In the New Zealand Health Survey (NZHS), there were no similar measures to compare with the pain-related outcomes used in the present study. There were discrepancies between self-rated health outcomes for this study and NZHS survey data. 23.0% of women in this study reported poor self-rated health, compared with 12.3% of women in the NZHS data (MOH, 2020). NZHS data reported that 22.9% of Māori women rated their health as poor, compared with 34.8% of Māori women in the present study (MOH, 2020).

One possible explanation for these differences is the framing of the surveys; the NZHS questionnaire may have implied a focus on physical health, whereas the NZFV study (with questions on mental and social wellbeing) may have been interpreted as having a mental health or general wellbeing lens. Findings between mental health outcomes in the NZFVS and NZHS are more comparable, despite use of slightly different definitions. In the present sample, 21.9% women had been diagnosed with any mental health condition, compared with 25.5% of women in the NZHS having received a diagnosis of

a mood (depression or bipolar) and/or anxiety disorder (MOH, 2020). Prevalence of mental health conditions for Māori women were also similar, with 28.5% of Māori women in the sample reporting diagnosis of a mental health condition, compared with 27.6% of Māori women in the NZHS having received a diagnosis for a mood and/or anxiety disorder (MOH, 2020). Overall, prevalence rates between the sample and NZHS were similar, and slightly lower estimates in NZHS data could be explained by the NZHS definition excluding substance abuse disorders and PTSD.

Some further similarities can be drawn using available NZHS data on the prevalence of chronic diseases. For example, 14.9% of the sample reported an asthma diagnosis, compared with 13.4% in the NZHS, 19.9% reported a diagnosis of arthritis compared with 18.4% in the NZHS, and 1.8% of the sample reported having experienced a stroke compared with 1.3% in the NZHS (MOH, 2020). In general, both the NZFV and NZHS surveys are likely prone to the same types of biases as they rely on self-reported data and voluntary participation. Issues relating to potential healthy sample biases are discussed later in the limitations section.

8.3. Comparability of Findings with the Structured Literature Review and Other International Research

8.3.1. Associations between any lifetime IPV and health outcomes

Any lifetime exposure to IPV was significantly associated with increased risk for five of the seven health outcomes in the present study. Reporting any lifetime IPV produced increased odds of having poor self-rated health (AOR 1.79 [1.30-2.47]). This reinforces the findings from a number of studies included in the literature review, which consistently found that IPV exposed women were more likely to report poor general health or poor HRQoL, compared with women who had not experienced IPV (Brown et al., 2020; Coker et al., 2019; Dillon et al., 2013; Stubbs & Szoeke, 2021).

It has previously been reported that women who have experienced IPV are 1.5 to 2 times more likely to experience chronic pain, including headaches (Coker et al., 2002). Findings from studies in literature reviews of both Campbell (2002) and Dillon et al. (2013) also indicated that women exposed to IPV had higher risk for chronic pain. In the present study, women exposed to any IPV were 1.75 times more likely to recently experience pain or discomfort. Though these ‘recent’ pain-related outcomes did not specifically record chronic pain, they may serve as a proxy for chronic pain experience. Previous research has presented inconsistent findings as to whether women who have experienced IPV are more likely to use pain medication. For example, Montero (2013) reported that IPV exposed

women were more likely to use analgesia (OR 1.68), whereas 2/3 of the studies in the review by Dillon et al. (2013) found that women exposed to IPV were less likely to use painkillers. In the current study, recent use of pain medication did not quite reach significance for exposure to any lifetime IPV after adjustment for sociodemographic factors, though most specific types of IPV were associated with significantly increased odds for both recent and frequent use of pain medication outcomes.

In the present study, increased risk for diagnosis of a physical health condition for women exposed to any IPV was consistent with the findings presented in Stubbs and Szoeke (2021), which concluded that women exposed to IPV were more likely to experience gastrointestinal, musculoskeletal, respiratory, liver, urinary and renal diseases. As presented in the systematic review by Liu et al. (2020), a number of studies have found increased rates of diagnoses for several cardiovascular diseases and cardiovascular disease risk factors among women exposed to IPV. It could be observed that women exposed to any IPV had increased prevalence for most specific health conditions, including asthma (19.4% for lifetime IPV compared with 11.5% for no lifetime IPV) and CVD (9.2% for lifetime IPV compared with 7.3% for no lifetime IPV). Hypertension was excluded from this analysis. Importantly, these are unadjusted proportions that captured small numbers per condition; it is noted as a limitation here that the present analysis could not measure associations between IPV and specific diseases.

As previously mentioned, the effect of any IPV on mental health outcomes has been well-explored in the literature (Dillon et al., 2013; Dutton et al., 2006; Stubbs & Szoeke, 2021). In the current analysis, the greatest AOR was observed for the association between any IPV exposure and having a diagnosis of any mental health condition, presenting a near three-fold increased risk. Importantly, 34% of women who reported experiencing any IPV also reported receiving a mental health condition diagnosis (mostly depression or anxiety), compared with 13% of unexposed women. This reinforces the well-established association between IPV and mental health outcomes, and confirms that the effect is present for women in NZ. Interestingly, Hayes and Kopp (2020) found that poor mental health was strongly associated with a near nine-fold increase in reporting poor physical health among women; however, past-year IPV victimisation was not associated with poor self-rated physical health in this study. The potential interplay between poor mental health for women who have experienced any IPV and associations with physical health outcomes should also be recognised here; mental and physical health are not wholly exclusive and may affect each other.

8.3.2. Association between severe physical IPV and health outcomes

In general, severity (as well as duration) of IPV has been established as a stronger predictor of worse

health outcomes (Ellsberg et al., 2008). For example, the WHO's *Report on Violence and Health* posited that greater severity of IPV has a larger impact on both physical and mental health outcomes, though the authors did not specify their definition of severity (Krug et al., 2002).

The association between severe physical IPV and physical health outcomes was not comprehensively documented in the literature reviewed. Among the paucity of studies included in the review that explored IPV severity, few assessed IPV severity using comparable measures to the current study. The CTS2 produces severity scales, however many studies did not utilise these severity scales in analyses. Further, IPV severity measured using the CAS includes various IPV types, as opposed to separately recording and analysing experiences of severe physical IPV behaviours as in the present study. For example, one study found that as well as a significant association between exposure to any IPV compared with no IPV, exposure to severe combined IPV was a significant predictor of lower hair cortisol concentrations, a biomarker of HPA axis function (Alhalal & Falatah, 2020). While this association helps situate cortisol dysregulation on the physiological causal pathway between severe IPV and endocrine physical health outcomes, the combined severity measure meant it was not reported whether this association was also present for specific types of IPV (Alhalal & Falatah, 2020). Separate to the CAS, other severe IPV measurements have also combined severe physical IPV with other types. For example, a seminal study found that women who experienced severe physical *or any sexua*l IPV were increased risk of reporting poor health (adjusted relative risk [RR] 1.4 [0.7-2.7]) and developing a chronic disease (adjusted RR 1.2 [0.7-1.9]), though these were not significant (Coker et al., 2002).

Further, many previous studies have explored health outcomes for women who had recently experienced IPV, which problematises comparability with the lifetime measures used in the present study. For example, in a study of women attending general practices (thus already healthcare seeking), women exposed to severe combined abuse within the past twelve months were found to have worse physical and mental health status and quality of life, and were 4.5 times more likely to have used pain medication in the past two weeks, and were more likely to have visited healthcare services in the past twelve months compared with those unexposed to IPV (Hegarty et al., 2012). Compared with lifetime IPV experiences, measurements for recent exposure to IPV are more likely to capture acute impacts (such as injuries) directly resulting from severe physical IPV and therefore be associated with different healthcare-seeking behaviours and mental and physical health outcomes, and cannot be used to accurately assess long-term impacts. However, it is important to note that the present study does not exclude recent or current IPV experience and may also capture these effects.

8.3.2.1. Severe physical IPV compared with no IPV. Compared with no lifetime experience of IPV, this study found that exposure to severe physical IPV increased the risk of all physical health outcomes, excluding recent healthcare consultation. This is consistent with the few studies in the literature review that explored this association, such as two studies by Lacey et al. (2016; 2015), which found women exposed to severe physical IPV during their lifetime had worse self-rated physical health, increased prevalence for physical health conditions, and greater associations with arthritis, liver and kidney problems, compared with women unexposed to IPV. One study that compared severe physical IPV with no IPV found evidence for associations with cortisol dysregulation, which may help to explain the association between severe physical IPV and physical health (Basu et al., 2013). Again, these studies measured severe physical IPV only, therefore it is not possible to assess whether associations are due to respondents experiencing any IPV or severe physical IPV in particular.

8.3.2.2. Severe physical IPV compared with moderate physical IPV. The present study went further than many others that explored severe IPV; the findings revealed that in addition to increased risk compared with no IPV exposure, exposure to severe physical IPV also had deleterious impacts on health compared with *moderate* physical IPV. Few previous studies have compared outcomes associated with explicitly physical moderate and severe IPV experiences. Notably, the 2003 VAW Study used a comparable model and found that relative to those who did not report a history of IPV, women exposed to severe physical IPV were more likely to self-report their health as poor or very poor (AOR 2.73 [1.65-4.53]), than those exposed to moderate physical IPV (AOR 2.34 [1.25-4.40]) (Fanslow & Robinson, 2004). Similarly, those who experienced severe physical IPV were more likely to consult a health professional in the four weeks prior to the survey (AOR 1.86 [1.47-2.36]), than those exposed to moderate physical IPV (AOR 1.34 [1.01-1.78]) (Fanslow & Robinson, 2004). Interestingly, neither moderate or severe physical IPV were associated with recently consulting healthcare at the multivariate level in the current study. While the ORs reported in Fanslow and Robinson (2004) are greater than those found here (possibly indicating change over time), the pattern for severe physical IPV producing worse health outcomes was sustained.

One explanation for why experience of severe physical IPV was associated with greater risk of reporting worse health outcomes compared with moderate physical IPV (and other IPV types) could be that severe physical IPV entailed acts more likely for the victim to sustain injuries or gradual bodily harm, which may result in worse physical health outcomes over time (Campbell et al., 2002). In one study, victims of severe physical IPV were found to be at increased risk for TBI and effects of strangulation, for which outcomes (including stroke, chronic pain, headaches) may be dose-dependent

(Coker et al., 2005). That study also reported that disabilities associated with IPV were related to physical health outcomes, such as CVD, chronic pain, nerve system damage, or respiratory issues (Coker et al., 2005). Further, experience of moderate physical IPV may ultimately lead to worse health outcomes if it escalates to severe physical IPV. Escalation of IPV severity is characteristic of some relationships with IPV (especially those with recurrent IPV or controlling behaviours), however research has not consistently found that escalating severity is a predominant characteristic in all cases of IPV (Boxall & Lawler, 2021; Choi et al., 2019).

Interestingly, the consistently strong associations between any physical IPV (moderate and severe) and physical health outcomes appear to have encapsulated the effect of severe physical IPV, rather than moderate physical IPV. Exposure to moderate physical IPV behaviours in this study may have represented a different pattern of violence. Research has suggested that not all violence within relationships constitute the same patterns; one entailing "severe and escalating form of violence characterized by multiple forms of abuse, terrorization and threats, and increasingly possessive and controlling behaviour on the part of the abuser [sic]", while moderate violence in a relationship may be called 'common couple violence' where "frustration and anger occasionally erupt into physical aggression" (Krug et al., 2002, p. 93). It is possible that moderate IPV captured instances of common couple violence, which may not have the same adverse health outcomes as more systematic and severe types of IPV. Further, severe physical IPV measurement included exposure to moderate forms of physical IPV as *well* as severe IPV, which may have also included greater or cumulative exposure to moderate physical IPV behaviours. Importantly, it is possible that the associations between severe physical IPV and worse health outcomes may have been confounded or intensified by significant overlapping effects of other types, including the cumulative effect of multiple types of IPV.

8.3.2.3. Association between severe physical IPV and mental health outcomes. In contrast to physical health outcomes, the relationship between IPV severity and mental health outcomes has been thoroughly explored in the literature (Stubbs & Szoeke, 2021). Campbell's 2002 review noted that studies had already begun to find that severe IPV was associated with increased risk of PTSD. The review by Dillon et al. (2013) only reported on the effects of severe IPV on mental health outcomes, identifying several studies which found that severity or chronicity of IPV was associated with worse PTSD, depression and anxiety symptoms. The findings in the present study reinforce these conclusions, with women exposed to severe physical IPV almost twice as likely to report diagnosis of any mental health condition compared to those unexposed to IPV. Interestingly, women who experienced moderate physical IPV had greater odds of reporting any mental health condition

compared to those who reported experience of severe physical IPV. It is important to note that the associations between IPV exposure of all types and number of types experienced were consistently associated with increased risk for mental health conditions; it is difficult to ascertain which IPV exposure factors had driven the differing magnitudes in associations.

8.3.3. Association between IPV types and health outcomes

In many previous studies, experience of any IPV was utilised as the primary exposure. Any IPV was often defined using limited types of IPV (such as physical and/or sexual IPV only); the present study extends previous findings by including a broader range of IPV types. As indicated in the literature, specific types of IPV were associated with health outcomes to varying degrees. Physical and sexual abuse were the most commonly evaluated type of IPV exposure in the literature; it is well established that experiencing these IPV types pose increased risk for worse health outcomes (Stubbs & Szoeke, 2021). These findings were replicated by the present study, with exposure to any physical IPV (moderate or severe) significantly associated with all seven health outcomes. Interestingly, exposure to sexual IPV was only significantly associated with four of the seven health outcomes; this could be attributable to the fact it had the lowest prevalence of all IPV types. Further, other research such as Campbell et al. (2002) has reported that sexual abuse has been linked with gynaecological and pelvic and abdominal symptoms. However, these health outcomes were not specifically explored in the present study.

The strong associations between psychological IPV and six of the eight explored health outcomes highlight that this type of IPV is crucial to understanding health impacts of IPV. These findings reinforce the assertion in Stubbs and Szoeke (2021) that psychological IPV should be consistently included as a measure in IPV research and policy and practice initiatives. Further discussion of the implications of associations between psychological IPV and health outcomes is included later in this thesis. Other non-physical types of IPV (economic abuse and controlling behaviours) were also associated with increased odds of experiencing a range of health outcomes. However, it must be noted that the analysis of IPV types (as presented in Table 7.6) likely includes contamination from other types overlapping in the IPV exposure categories, as exposure to other types could not be actively excluded.

Supporting the findings of Stöckl and Penhale (2015), controlling behaviours were one of the IPV types consistently associated with all seven health outcomes, and experience of these behaviours was associated with the highest odds for recently consulting healthcare and having a diagnosis of a physical

health condition. This highlights the importance of directly measuring controlling behaviours in IPV research in order to capture a pattern or dynamic of control (Myhill, 2015). This is also important as controlling behaviours has also been considered as a predictor for severe types of IPV, including severe physical IPV (Aizpurua et al., 2021). Further, research has found that women who reported controlling behaviours were more likely to experience psychological and physical IPV, an overlap that was also found in the present study (Aizpurua et al., 2021).

Usually considered an element of psychological IPV, economic abuse has not received much direct attention in the literature (Jury et al., 2017). In addition to being associated with increased risk for experiencing recent pain or discomfort and having a physical health condition, women who experienced economic abuse were at the greatest risk for reporting diagnosis of any mental health condition compared with all other IPV types. It is of note that women who experienced food insecurity were three times more likely to experience economic abuse than those who reported food security in this sample; this reinforces previous research that poor women are particularly vulnerable to economic IPV (Sanders, 2015). The findings here confirm that economic abuse is an important area for future focus.

8.3.4. Association between multiple types of IPV and health outcomes

8.3.4.1. Number of IPV types experienced. In analysis comparing associations by number of types of IPV experienced, a dose-response effect was found. These findings reinforce long-standing claims that exposure to different types of IPV over time has a cumulative effect on health outcomes (Krug et al., 2002). However, few studies in the literature analysed associations by the number of types experienced, and IPV types were differentially measured or defined where incorporated; therefore the 'number' of types cannot be compared easily. In the present study, reporting experience of four or five IPV types was consistently associated with all physical health outcomes, including a two-fold increased risk of recently consulting healthcare and having a diagnosis of any physical health condition. This extends previous research by indicating that dose-response relationship is present for experience of multiple IPV types, and confirms this as an important IPV factor in assessing associations with outcomes (Montero et al., 2013). Further, many studies, including those identified in the literature review, used convenience samples from healthcare settings to explore healthcare utilisation; the present study provides population-based evidence to suggest that healthcare utilisation is greater for those who experience more types of IPV. For example, a study of women from a primary care setting found that those who were exposed to three types of abuse (physical, emotional, and sexual abuse) had worse quality of life and mental health, used more medications, and were more likely to

seek mental healthcare (but not general practice services) than those in one or two type abuse categories (Hegarty et al., 2012); however, it is important to note that this study used a severe combined category from the CAS.

A significant finding was that women exposed to four or five types of IPV were almost four times more likely to have received a diagnosis for any mental health condition. This substantial increase is consistent with findings from several studies included in Dillon et al. (2013), in which experiencing more than one type of IPV increased the odds of reporting depressive symptoms, PTSD symptoms, and increased severity of those symptoms, and suicidal ideation. This suggests that a dose-response relationship is particularly strong for exposure to multiple types of IPV on mental health outcomes, and effects may be compounded through experience of additional types.

Given the identification of a dose-response effect of experiencing multiple IPV types on associations with poor health outcomes, it is important to reiterate that analyses for specific IPV types may have been contaminated by overlapping experiences of multiple types. To provide an example, it is possible that those who experienced severe physical IPV may have been more likely to experience additional types, therefore associations may have been partially driven by the number of types experienced as opposed to the nature of severe physical IPV itself. However, it was not feasible nor appropriate to assess associations using exclusive IPV types given the complex interrelationship between IPV types, and the incremental model served as a cross section to extract exclusive and combined exposures where possible.

8.3.4.2. Combinations of IPV types. Specific combinations of IPV types were analysed in an incremental model, which provided a snapshot of associations by the number of IPV types using specific IPV types and facilitates comparisons with studies that explore the effect of multiple types using the same IPV type combinations. Scholars have suggested that singular types of IPV rarely occur in isolation, and as individual types of IPV are known to affect different health outcomes, subgroups and IPV patterns should therefore be considered within models (Dutton et al., 2005; Scott-Storey, 2011). In the present study, the dose-response relationship found by number of IPV types was also observed in the incremental model, which found worse outcomes for women who experienced additional types of IPV. Women with combined exposure to psychological and physical IPV had increased odds for reporting four of the seven health outcomes. Comparisons can be drawn with a similar model of cumulative IPV exposures used by Potter et al. (2021), which found that combined exposure to psychological and physical IPV increased the odds of poor self-reported health (AOR 1.74

[1.46-2.09]; 1.56 [1.04-2.34] in the present study), experiencing recent pain or discomfort (AOR 1.70 [1.49-1.92]; 1.66 [1.13-2.45] in the present study), and recent use of pain medication (AOR 1.60 [1.39-1.85]; 1.66 [1.13-2.45] in the present study). In the next increment, combined exposure to psychological, physical and sexual IPV produced greater odds for associated health outcomes in Potter et al. (2021). This combination was associated with five outcomes in the present study, for which most associated odds increased in magnitude compared with exposure to physical and psychological IPV only. The greatest associations with worse health outcomes being found when sexual IPV was added to physical and psychological IPV in the model supports other findings that this combination most adversely affects health outcomes (Dutton et al., 2005; Hegarty et al., 2012; Potter et al., 2021). This may represent a cumulative correlate of IPV severity and may include more severe physical acts; one study hypothesised that the addition of sexual IPV (via forced sex acts) may indicate more severe IPV overall (Dutton et al., 2005).

In the present study, those who experienced *only* psychological IPV (not discounting controlling behaviours and economic abuse) were at significantly increased risk for experiencing recent pain or discomfort, and were almost twice as likely to report a mental health diagnosis. It has been proposed that the significantly increased risk for reporting poor general health associated with psychological IPV is related to distress (Al-Modallal, 2016). As previously mentioned, this supports the importance of sufficiently assessing psychological IPV and other non-physical IPV types in research and practice. In this model, psychological IPV was not contaminated by physical types, which were actively excluded (though economic abuse and controlling behaviours may also be present). Psychological IPV had the greatest prevalence of all types, including the highest prevalence of exclusively experienced IPV types. This is consistent with other research that suggests psychological IPV is often experienced exclusively from other types (FitzPatrick et al., 2022).

While experience of psychological IPV alone was associated with less health outcomes than those including physical and sexual IPV, these findings should not be interpreted to suggest that experience of psychological IPV on its own does not have deleterious health impacts. The association with increased risk for experiencing pain or discomfort is particularly important as it ascertains that IPV experiences do not need to involve physical actions to be impactful on women's physical health, in addition to confirming the mental health impacts of psychological IPV. Other studies have found worse physical health outcomes for women exposed to psychological IPV only. For example, FitzPatrick et al. (2022) observed that experience of emotional IPV alone was associated with a two-fold increase in poor general physical health (AOR 1.9 [1.2-3.1]), in addition to worse mental health outcomes. In

another example, Potter et al.'s (2021) analysis of a large international dataset (n=21,221) found that those exposed to psychological IPV alone were 1.5 times more likely to report poor general health, 1.4 times more likely to have recently experienced pain or discomfort, and were 1.5 times more likely to have recently taken pain medication.

Further, other research has posited that psychological IPV (including controlling behaviours and verbal aggression) is often a precursor to physical types of IPV (Karakurt & Silver, 2013; Schumacher & Leonard, 2005). Studies using comparable models hypothesised that different combination categories may capture respondents at different stages of worsening IPV experiences (Dutton et al., 2005). Further, an Australian study found that emotional abuse was the most common form of abuse leading up to IPV homicide (Australian Institute of Health & Welfare, 2019). Thus, psychological IPV and other non-physical types of IPV should be considered risk factors for other types of IPV in addition to having deleterious outcomes on their own.

8.4. Pathways Between Experience of IPV and Physical Health Outcomes

Whether explored through severity, IPV types, or exposure to multiple types, the association between lifetime experience of IPV and physical health outcomes likely follow similar causal pathways. As previously mentioned, assessing causal pathways is not within scope of this analysis. However, external research (including the systematic literature reviews that explored causal pathways discussed in Chapter 2) is briefly referenced below to further describe and contextualise possible causal links between IPV and physical health outcomes.

8.4.1. Biological, physiological, and psychological pathways

As highlighted in the literature review, research has begun to explore the biological and physiological mechanisms that cause worse health outcomes for those exposed to IPV. Research has long posited an association between trauma and physical health, which has been attributed to psychological correlates (primarily depression, PTSD, and coping), biological functions via psychoneuroimmunology and alterations to the allostatic load due to PTSD-related neurological and physical strain caused by prolonged physiological stress activity, and behavioural factors (Black, 2011; Schnurr & Green, 2004).

As previously mentioned, it has been asserted that research broadly pertaining to stress cannot be haphazardly applied to the IPV context, and pathways between IPV-related stress to health outcomes must be directly explored (Yim & Kofman, 2019). As Liu et al. (2020) contended, exposure to the

direct or indirect stressors of IPV may cause chronic inflammatory states, which is hypothesised to affect victims on physiological, biochemical, or endocrine levels. This stimulates physiological stress response systems, including the autonomic nervous system and the HPA axis, which can cause systematic changes such as increased heart rate and blood pressure, reduced insulin sensitivity, and over-circulating stress hormones to organs such as the heart (Liu et al., 2020). As highlighted by Yim and Kofman (2019) and reinforced in the structured literature review, studies exploring the association between IPV and endocrine and immune-inflammatory biomarkers have so far been methodologically limited and inconclusive; large-scale interdisciplinary work in this field is nascent.

Yim and Kofman (2019) found that many studies now explore IPV as a chronic psychological stressor and utilise validated stress measurements; stress factors were also measured by numerous studies included in this thesis' structured literature review. Research suggests that chronic psychological stress from physical and non-physical IPV types can cause physiological changes, which in turn can lead to various adverse health outcomes (Scott-Storey, 2011). In terms of the effect of multiple types of IPV, it is likely that exposure to numerous types of IPV compound the impact of stress on the body. It has also been posited that indirect, secondary stresses from IPV (such as financial, legal, emotional, and parenting concerns) can persist long after an abusive relationship has ceased (Yim & Kofman, 2019). In tandem with IPV-related stress, it has been suggested that injuries and chronic pain directly caused by IPV may trigger or amplify stress-related health issues such as headaches and sleep disturbances (Cheng & Lo, 2019). Though not explored in the present study, sleep disturbance has been posited as another possible pathway between IPV exposure and physical health outcomes. Previous qualitative and quantitative studies have found that IPV can negatively affect quality and quantity of women's sleep due to PTSD, depression, and perceived risk of sleeping in the presence of a perpetrator (Dillon et al., 2013; Kendall-Tackett, 2007).

In understanding the impact of IPV on women's *physical* health, it is also important to consider mental health and psychological measures (such as any diagnosed mental health condition, as used in the present study). Research has suggested that mental health conditions, such as depression and PTSD, may mediate the pathway to physical health, impacting the degree to which IPV deleteriously affects physical health (Scott-Storey, 2011). Depression and hostility have been identified as sequelae that also affect physiological processes, by evoking inflammatory states in chronically stressed women who have experienced IPV (Kendall-Tackett, 2007). Various scholars have purported that PTSD is a major mediator in the pathway between IPV and adverse health outcomes, as PTSD has been proven to worsen health symptoms and the course of morbidity (Dutton et al., 2006). IPV exposure, including

IPV severity and cumulative effects of multiple types, has been consistently associated with increased risk for PTSD symptomology and diagnoses (Dillon et al., 2013). IPV was consistently associated with substantially increased risk of having a diagnosed mental health condition in the present study, which factors into the complex relationship between IPV experiences and physical and mental health issues.

8.4.2. Health risk behaviours

While substance abuse disorder was included in potential diagnoses of a mental health condition, the role of health risk behaviours in the association between IPV and health outcomes was not assessed in the present study. However, health risk behaviours (particularly substance abuse) have been thoroughly explored in the literature to date. Maladaptive coping behaviours for IPV-related stress (including drug use, smoking, alcohol use, physical inactivity and unprotected sex) are all risk factors for a range of poor health outcomes, including cardiovascular diseases (Liu et al., 2020). Liu et al. (2020) found that adoption of smoking and alcohol consumption was higher among women exposed to physical and sexual IPV, especially for women who experienced severe physical IPV. A systematic review of cohort studies exploring recent IPV exposure and health effects found that a number of studies showed a positive direction of association for increased alcohol use, and some bidirectional relationships for hard drug and marijuana use following IPV exposure (Bacchus et al., 2018). However, the study only explored recent IPV exposure; it could not be established whether increased use of alcohol and drugs was maintained following cessation of IPV in the long-term.

Other studies have found adoption of health-risk behaviours does not wholly explain the relationship between IPV exposure and poor health outcomes. Coker et al. (2019) found that negative health behaviours (including alcohol abuse, sedentary lifestyle, and smoking) were not a strong mediator between IPV and poorer HRQoL. Further, Wright et al. (2019) found that alcohol dependence was not a partial mediator between IPV exposure and CVD. Increased uptake of health risk behaviours may partially explain the increased risk of physical health outcomes experienced by women exposed to IPV, and may help to identify effective trauma-responses and recovery interventions to mitigate the impact of IPV on health outcomes.

8.4.3. Other indirect pathways

Indirect pathways for worse health outcomes may also include decreased agency pertaining to life choices, such as limited mobility and ability to access resources and services, and lower rates of preventive healthcare screening, such as cervical cancer screening and mammography (Dillon et al.,

2013; Stöckl & Penhale, 2015; Stubbs & Szoeke, 2021). These factors may be of particular relevance to women experiencing controlling behaviours or economic abuse.

8.5. Strengths of the Present Study

The 2019 NZFVS was the largest survey on family violence conducted in NZ since the 2003 VAW Study, and its sample was broadly representative of the NZ population. The population-based setting ensured the sample was representative of the whole population, not just those who were seeking support from healthcare or IPV support services. Comparability with population-level ethnicity and area deprivation level indicated that participation biases were not present across these groups. Given the overall representativeness of the survey, it can be affirmed that the findings, including IPV prevalence, are generalisable for women in NZ.

The NZFVS did not have an upper age limit unlike the original WHO MCS (limited to participants under 49 years old), and the 2003 VAW study (limited to participants under 64 years old). Thus, this study has provided a more comprehensive understanding of older women's experiences of IPV, which has previously been underexplored in the literature. Higher prevalence for physical health outcomes among older women (as expected) confirms the importance of including older age groups to allow for sufficient time to lapse for health conditions to manifest.

As the survey is based on the WHO MCS, findings can be easily compared with international studies utilising similar survey designs. Therefore, the findings produced here contribute to the international repertoire of knowledge relating to a number of IPV factors, including association with physical health outcomes. By closely complying with WHO guidelines for ethics and safety, the study likely maximised IPV disclosure among respondents (2001). Further, the 2019 NZFVS gathered a broader range of data pertaining to health outcomes than the original WHO MCS, including diagnoses of health conditions, which extended the scope beyond acute impacts of IPV. The survey collected information on a wide range of sociodemographic factors, IPV types, and health outcome measures. This enabled adjustment for potential confounding for a number of associated sociodemographic factors in the analyses.

As outlined in the literature review, it is of particular importance that this study assessed psychological IPV and the relatively newly studied types of economic abuse and controlling behaviours, as these areas have historically been underexplored. The findings related to these IPV types further supports the case for recording and analysing these IPV types in future research. The survey used targeted

questions to purposefully capture tactics and patterns of controlling behaviours. In the analysis stage, two-measure thresholds were used for controlling behaviours and psychological IPV variables to avoid capturing one-off or non-systematic occurrences of aggression.

A key strength of the data analysis was that it was designed to directly address the gaps identified in the structured literature review conducted in this thesis. This included analysis of long-term effects of IPV severity, different types of IPV, and the effect of exposure to multiple types of IPV. In addition to exploring prevalence rates for any lifetime IPV and specific IPV types, the analyses explored overlap of different IPV types, which also enabled a specific set of combinations of IPV types to be assessed.

8.6. Limitations of the Present Study

The study's findings are tempered by a number of methodological factors, many of which are consistent with the nature of research on IPV.

8.6.1. Selection bias

The sampling method had exclusions, which affected who was recruited into the sample. Sample selection was also hindered by a large number of unoccupied housing and inaccessible housing (i.e., apartment buildings and gated communities) (Fanslow et al., 2021). Underrepresentation of younger groups limited understanding of IPV prevalence for younger women. Women who could not engage in conversational English were also excluded, which could have missed capturing the experiences of women who have recently migrated to NZ. There are implications from these exclusions, such as underestimated prevalence of IPV and physical and mental health outcomes.

Underestimation of IPV prevalence may have underestimated the association between IPV and physical health outcomes in the present study. Sampling bias may have excluded those in the immediate aftermath of IPV exposure, as recruitment could not capture those engaged with service providers (such as Women's Refuge) (Fanslow et al., 2021). Those currently in relationships with abusive and controlling partners may also be less likely to be involved in surveys and engagement with strangers (Fanslow et al., 2021). Further, the study may have excluded participants at high-risk of IPV exposure, such as those in prisons and residential institutions. The true prevalence of IPV is likely always underestimated in research due to methodological and disclosure issues, including in the present study (WHO, 2021b).

The prevalence rates of health outcomes may have been underestimated; the study may have presented a relatively healthy sample compared with the general population. Rest homes, hospitals, and retirement villages were not included in the sampling; those who require full time care, and thus more likely to have chronic illnesses, were excluded. Participation in the study was voluntary (63.7% of eligible women agreed to participate), therefore those who were feeling unwell or who were preoccupied with health issues could have been less likely to participate. Those who were hospitalised for extended periods while households were contacted (including follow-up) would also have been excluded. This may have underestimated the association between IPV and health outcomes.

As such, a small number of individuals reported specific health diagnoses despite a relatively large sample of ever-partnered women. This meant that aggregate variables had to be used for physical and mental health conditions, and the study could not confidently explore associations with specific health conditions. Hypertension was therefore excluded from the physical health condition outcome in order to capture more severe conditions with the aggregate variable. A number of bivariate and multivariable logistic regression analyses produced results that approached but narrowly missed statistical significance. However, increased odds ratios were in the direction predicted for association between IPV and most health outcomes, even where statistical significance was not reached.

8.6.2. Information bias

NZFVS data collection was conducted via face-to-face interviews with trained interviewers, in compliance with WHO's recommendations for maximising participant safety and disclosure (Ellsberg et al., 2001). However, reliance on participants' self-report for data collection may have been affected by recall bias. Underestimation of IPV prevalence may have been partially attributable to social desirability bias, whereby participants to avoid disclosure or minimise the severity of violence due to perceived stigma (Ellsberg et al., 2008). Further, it is possible that older participants may have been more susceptible to recall bias for specific IPV experiences, especially those that happened a long time ago.

Health outcomes also relied on self-report for identification, which may have been influenced by recall bias if participants could not accurately remember healthcare experiences. It is possible that diagnosis of physical and mental healthcare conditions was underestimated. Though measures based on diagnosis are strengthened by confirmation by a medical professional, the study relied on participants ability to recall diagnoses and could not capture undiagnosed health conditions, such as early-stage illness or health conditions among those who did not seek healthcare.

The experience of pain outcome, as collected in the NZFVS, could not further differentiate between chronic pain disorders (such as fibromyalgia), other acute experiences (e.g., from an injury), or psychosomatic symptoms, and served as an aggregated proxy for these outcomes. Similarly, the role of particular health issues (such as mental health, substance abuse, infectious diseases, weight issues, or reproductive issues) in the associations with self-rated health, pain or healthcare consultation outcomes could not be quantified within the data parameters.

Though it is a standard measure in the WHO MCS, consultation of a healthcare professional in the past four weeks may be incidental and not serve as an accurate depiction of healthcare utilisation. To gauge higher usage, an alternative measurement could have captured healthcare utilisation over a longer time period, such as consultation frequency per year used by Prosman et al. (2012). Moreover, self-reported healthcare use data does not account for visit length or complexity, which are important factors in health system impacts (Walker et al., 2004).

8.6.3. Study design

The cross-sectional nature of this study limited the ability to discern causation from the analyses. For example, it could not be determined whether those who experienced food insecurity were more likely to experience IPV, or exposure to IPV contributed to issues concerning food security. It is also possible that women with physical health conditions related to disability or dependency are more susceptible to IPV. However, the fact that exposure to numerous types of IPV had increasingly stronger associations with poorer health outcomes suggests there is a dose-response relationship, which is one of the Bradford-Hill criteria that increases confidence that an association is causal (Fedak et al., 2015). Further, as noted by Dillon et al. (2013), some longitudinal studies have established causation between IPV exposure and physical health outcomes which strengthens the ability to infer causation.

8.6.4. Temporality factors

The present study was limited in that it did not differentiate between those who were currently experiencing IPV and those who had experienced IPV previously, and did not account for whether respondents were still with the partner that abused them, or how long since they had been separated. These factors were not considered due to difficulties in ascertaining comparable timelines for respondents' IPV exposure, and doing so may have diminished sample numbers. Older women are more at risk for a range of health outcomes, but also may have had longer-term IPV exposure. However, lifetime experience of IPV is useful for capturing the long-term and persisting impacts of IPV. Similarly, explorations of exposure to multiple types of abuse were not delineated by current or

past partner or timelines since abuse in the present study. Therefore, it is not clear whether women's experiences of multiple IPV types were concurrent or inflicted or repeated by different partners during their lifetime, and whether this would have an effect on associations with physical health outcomes.

8.6.5. Data and scope constraints

The 2019 NZFVS was a robust and comprehensive survey that provided sufficient measures to achieve the primary purpose of this study: to explore associations between women's exposure to IPV and health. Nevertheless, a number of supplementary covariates and outcomes were identified in the literature review that could have expanded this study through development of further analytic models, but were limited by data collected in the NZFVS due to time and scope constraints.

It was not within the scope of this thesis to attempt to untangle the complex relationship between IPV, mental health, substance abuse, and poor physical health outcomes. For example, this study could not adjust for potential confounding or mediating pathways from health risk behaviours (such as smoking, alcohol abuse, or physical inactivity), as data was not collected on cigarette smoking or physical inactivity in the NZFVS. Additionally, the possible mediating role of mental health variables, such as PTSD (for which data was not gathered by NZFVS) or depression, could not confidently be explored. Finally, the study did not incorporate potential moderating factors such as resilience, coping, and social supports. As suggested by Scott-Storey (2011), these factors could in future assist with understanding why some women exposed to IPV develop worse health outcomes and others do not, and be used to strengthen interventions. These factors should be considered in research going forward.

8.7. Implications and Recommendations

8.7.1. Research implications

- While associations between IPV exposure and physical health outcomes have been indicated in the literature and would be expected, this research provided further substance to and quantified these claims using a representative, population-based sample and robust methodology and analysis.
- In addition to identifying NZ women's high prevalence of IPV, including overlapping and non-physical types, this research imparts strong evidence for associations between exposure to IPV and a range of health outcomes in NZ, which has not received attention in the past twenty years.

- Beyond a broad association between any lifetime IPV and worse health outcomes, this research substantiated and extended existing findings by adding nuance around IPV severity, IPV types (including non-physical types), and experience of multiple types of IPV.

8.7.2. Research recommendations

8.7.2.1. Further studies exploring health outcomes associated with IPV. Planned analyses around linkage with hospitalisation data from the MOH National Minimum Dataset were excluded from the present study due to external data management constraints caused by the COVID-19 pandemic. These analyses are the next step in extending the present research, and will be conducted to explore associations between IPV exposure, diagnoses, and health service use through hospitalisation records, in order to determine concordance with the self-reported data utilised here. It will also allow further scope to explore economic implications.

This study falls within a suite of research using data from the 2019 NZFVS. Further analysis should include a similar study using the survey's male respondents, which could also be utilised for comparing exposure and association patterns for IPV and health outcomes between women and men.

Future research should incorporate developing measurements of severe psychological abuse to build on findings related to severe physical abuse, using standardised and validated tools to enable comparability, such as those conceptualised by Heise et al. (2019). This is especially important as recent analyses found that the prevalence of non-physical types of IPV may be increasing in NZ (Fanslow, Malihi, et al., 2021a).

To further understand the causation patterns between IPV and adverse physical health outcomes, prospective longitudinal studies with a range of validated IPV measures are recommended. As shown in the present study, this should include severity, IPV types (including controlling behaviours and economic abuse), and impacts of multiple types of IPV and other adverse experiences. NZ-based longitudinal research such as the Growing Up in New Zealand and Dunedin Studies should comprehensively plan for inclusion of these IPV measures and correlates. Larger sample sizes may also enable further classification and analysis of IPV type (including exclusive types) and combination sub-groups.

This study reinforces research identified in the literature review which suggests that IPV is associated with increased odds of experiencing physical health conditions, explored here via an aggregated

measure. Future research should continue to explore the associations between IPV exposure and non-communicable physical health conditions (such as CVD) using large, population-based samples to gather sufficient data on *specific* health conditions and diseases.

8.7.2.2. Further studies exploring causal pathways between IPV and health outcomes. In exploring causal risk factors and indicators for physical health conditions, studies could use objective clinical measures to minimise reporting biases. Utilising clinical measures for stress-related correlates (such as biological cardiovascular risk factors, and endocrine and immune-inflammatory biomarkers) will also assist in better understanding the pathways by which IPV exposure worsens health outcomes. In addition, psychological IPV severity should also be considered alongside physical severity to explore the impact of varying degrees and types of IPV severity on biomarkers of stress, as in the study by Alhalal and Falatah (2020). As put forward by Yim and Kofman (2019), researchers exploring stress in large and cost-prohibitive biological studies should include measurements for IPV exposure where appropriate. Importantly, studies designed for different purposes should ensure that all ethical and methodological requirements for conducting violence-related research are met in line with WHO recommendations (WHO, 2001).

Despite high prevalence rates of IPV, not everyone who experiences abuse develops worse health outcomes. Research that explores moderating factors (such as social support and resilience) should be undertaken to understand why differing outcomes occur, especially in the context of multiple types of abuse. Understanding moderating pathways will enable interventions to take place where prevention has not been possible, in order to ameliorate adverse health outcomes for women exposed to IPV (Dutton et al., 2006). For example, recent research using the NZFVS data found that cessation of violence, support at disclosure (but not the act of disclosure itself), and ongoing informal support were associated with positive mental health outcomes for women exposed to physical and/or sexual IPV (Pir et al., 2021). Understanding of these positive mental health factors is crucial for developing and implementing supportive pathways following IPV exposure, but remains underexplored (Pir et al., 2021).

Further, to illuminate causal pathways and possible intervention points for a range of health outcomes, future research should create and integrate models that consider the mediating role of mental health symptomology and conditions, including PTSD, perceived stress and depression, as in Coker et al. (2019). Similarly, the role of health-risk behaviours (such as alcohol abuse, smoking, and physical activity) should be explored. Exposure to childhood abuse, non-partner sexual assault and other forms

of victimisation or trauma should also be included in order to further delineate impacts and foster the development of appropriately tailored responses (e.g. MacIntosh et al., 2015; Nikulina et al., 2021; Renner et al., 2017; Scott-Storey, 2011). To sufficiently address inequities in both IPV prevalence and health outcomes for vulnerable communities in the NZ setting, the impact of IPV exposure on health outcomes (including potential moderating and mediating factors) should be explored using culturally appropriate frameworks.

8.7.3. Practice implications

- By evidencing associations between IPV exposure and physical health outcomes, this research confirms that IPV is a major public health issue in NZ, and provides leverage for mobilising the healthcare sector to respond to IPV and its health consequences.
- This research calls attention to the long-term implications of IPV for physical and mental health, even where lifetime IPV exposure may be historical. This highlights the need to distinguish between acute and historical IPV responses in practice, as implementation of additional trauma-recovery pathways are required once immediate safety needs are met, in order to address the long-tail of IPV exposure and mitigate long-term risks for adverse health outcomes.

8.7.4. Practice recommendations

8.7.4.1. IPV screening and identification in healthcare settings. As reinforced in the findings here, women who have experienced IPV have higher rates of health issues, and thus present to health services more often than women unexposed to IPV. This situates healthcare services as prime settings for IPV identification and support, and the findings here highlight the need for healthcare services to be mobilised and engaged to respond to IPV and its effects.

Recommendations from the American Medical Association's 1992 Council of Ethical and Judicial Affairs hold true thirty years after its initial publication; physicians have an obligation to screen and identify cases of IPV, and to familiarise themselves with referral pathways, and physicians have a duty to understand, challenge and prevent societal misconceptions about IPV (Clark et al., 1992). Identified misconceptions included considering IPV rare and non-existent in 'normal' relationships, and victim-blaming ideas about causes and continuations of abuse (Clark et al., 1992). Ethical obligations of medical professionals also include confidentiality and informed consent from victims for non-emergency interventions (Clark et al., 1992).

WHO's (2013) clinical and policy recommendations for responding to IPV and sexual violence against women should be locally and culturally adapted and integrated into healthcare settings. The recommendations include women-centred care and healthcare professionals enquiring about IPV exposure when women present with conditions that may have been caused by IPV (WHO, 2013). In addition to acute injuries and mental health issues, this includes a range of physical health conditions and symptoms, many of which have been reinforced in the present study (Black, 2011). Interestingly, the WHO (2013) do not recommend wholesale implementation of routine enquiry of IPV, as this is conditional on sufficient referral pathways and resources at the local level. Given NZ's existing referral system, routine enquiry is possible in the NZ setting but should be increased alongside strengthening of referral pathways and victim care systems.

Evaluations of the NZ MOH Violence Intervention Programme, which focuses on early identification, assessment and referral of victims presenting to District Health Board services, have found that while system change has been implemented to support clinicians in responding to IPV, low rates of assessment and disclosure prevail with high variation across settings (Gear et al., 2020). In the most recent annual evaluation, the proportion of women assessed for IPV ranged from 28% in the emergency department to 75% in sexual health services, and IPV disclosure by assessed women ranged from 7% in the emergency department to 29% in community mental health services (Gear et al., 2020). Importantly, the quality of IPV enquiry influences women's decisions to disclose IPV to healthcare professionals (Gear et al., 2020). Particularly low rates of disclosure by Māori women indicate that culturally responsive services need to be developed (Gear et al., 2020). It has also been noted within international settings that one of the most significant barriers to healthcare providers enquiring about IPV is clinicians feeling unprepared to adequately respond to IPV disclosure (Black, 2011). This emphasises the importance of clinician preparedness, and the need for strong and clear referral pathways to be embedded into response systems.

The high prevalence of psychological IPV in this study reinforces the need for routine enquiry to integrate behavioural questions pertaining to psychological IPV (as is currently recommended in the Family Violence Assessment Guidelines), as it may be missed by screening that focuses on physical or sexual IPV (Fanslow & Kelly, 2016). In addition, early identification of psychological IPV or other non-physical types of IPV may be crucial in intercepting and responding to IPV before escalation to severe physical IPV or exposure to additional types, which have been shown here to produce worse health outcomes.

8.7.4.2. Training for healthcare providers. In NZ and internationally, healthcare providers need to be trained and supported to routinely and comprehensively enquire for both current and lifetime IPV status in clinical practice, which uses evidence-based methods for enquiry (Fanslow & Kelly, 2016). This requires a 'whole-of-system' approach (including coordinated community action) with integrated primary and secondary care (Fanslow & Kelly, 2016).

As suggested by numerous studies, well-designed and comprehensive IPV curricula should be required in medical, nursing, and public health schools and relevant residency programs to train healthcare professionals in providing quality care and services (Ambikile et al., 2021; Clark et al., 1992; García-Moreno et al., 2015). Pre-qualification training for healthcare providers in first-line support is strongly recommended by WHO (2013). A recent integrative literature review found that limitations in IPV response training and curricula included insufficient time for training, limited content in current curricular, lack of institutional endorsement of course content, and funding for curricular development and implementation (Ambikile et al., 2021). This training should be well-funded and supported, and continued throughout relevant professions via ongoing supervision, mentorship and capacity building (García-Moreno et al., 2015).

8.7.4.3. IPV response settings. Implications of these research findings for IPV response settings are described here; discussion of relevant policy and practice incentives in NZ's current context are further described under policy recommendations below.

Inequities in IPV prevalence identified in this thesis emphasise NZ's need to meet culturally appropriate best practice standards, including expanded kaupapa Māori family violence services and integration of Whānau Ora approaches across sectors (Fanslow & Kelly, 2016). Further, culturally appropriate support programmes for women who have experienced IPV need to address stress and health-related factors for recovery. Interventions that interrupt the causal pathways between exposure to IPV and poor health outcomes should be explored and implemented with strong government and health sector support.

Beyond initial identification, it is worth considering the importance of non-physical experiences related to economic abuse and controlling behaviours in responses to IPV. For example, appropriate risk matrices, such as those developed by Jury et al. (2017), should be utilised by practitioners and services that may encounter individual experiencing economic abuse. These may include social workers, Work and Income NZ staff, counsellors and police (Jury et al., 2017). In addition to

identification of appropriate referral pathways, understanding of the nuances of economic abuse and controlling behaviours could help to inform tailored responses and assistance within IPV response settings.

8.7.5. Policy implications

- These findings reinforce the need to address the high prevalence of IPV towards women in NZ, including the need to develop policies incorporating prevention and intervention measures for various types of IPV and their interrelated nature.
- Despite the finding that IPV was prevalent across the sample, low sociodemographic groups (as indicated by food insecurity, education, and employment) and women of Māori ethnicity were disproportionately burdened by both lifetime IPV exposure and worse health outcomes.

8.7.6. Policy recommendations

Te Aorerekura: National Strategy to Eliminate Family Violence and Sexual Violence ('Te Aorerekura') was published at the time of writing this thesis, and aims to "address the structural drivers of family violence and sexual violence and prevent harm from occurring, respond to violence in a timely, trauma-informed and culturally competent way and support long-term healing" and details an Action Plan for achieving these goals (New Zealand Government, 2021, p. 16). Developed alongside communities, *Te Aorerekura* proposes six shifts, towards: strength-based wellbeing, mobilising communities, skilled, culturally competent and sustainable workforces, investment in primary prevention, safe, accessible and integrated responses, and increased capacity for healing (New Zealand Government, 2021).

The long-term implications of IPV evidenced in this thesis welcome a whole-system, life-course approach to addressing IPV for women in NZ. The findings here indicate the necessity for well-resourced and comprehensive implementation of the preventative and therapeutic measures detailed in *Te Aorerekura*, which will also work towards to minimising the health impact of IPV in NZ.

The staggering proportion of 56.5% of Māori women having experienced any IPV in this sample warrants direct attention in IPV responses. In addition to primary prevention measures, *Te Aorerekura* aims to improve and enable bespoke and appropriate responses and healing solutions to violence, including kaupapa Māori responses. In line with these goals, the NZ government needs to adequately fund and support these culturally informed intervention and prevention strategies. This should incorporate kaupapa Māori and whānau-centred services for preventing men's perpetration of

violence, as put forth by the Family Violence Death Review Committee (2020). As previously mentioned, these initiatives may help to alleviate the burden of IPV experience if responses are adequately implemented and targeted to causal pathways to mental and physical health outcomes. Further, families struggling with poverty and low socioeconomic areas should receive particular attention and support in IPV prevention and interventions. Targeted and comprehensive welfare support needs to be provided to low-income women and families, particularly women leaving abusive relationships, in order to alleviate the burdens of poverty, IPV experience, and health issues.

Te Aorerekura proposes to work with other national strategies, including the *Disability Strategy and Action Plan, Better Later Life – He Oranga Kaumātua*, and *He Korowai Oranga – NZ's Māori Health Strategy* (New Zealand Government, 2021). The present study emphasises this need for *Te Aorerekura* to collaborate with a broad range of physical and mental health objectives and strategies, because if IPV is not addressed in health outcomes, national efforts are missing a significant key factor in the causes and contributors of significant health burdens. In addition to the physiological and biological causes for worse health outcomes, this echoes the imperative raised in Campbell's landmark review 20 years ago, "If abuse contributes to factors such as smoking, poor nutrition, substance abuse, and stress, interventions aimed at these problems will not succeed without addressing intimate partner violence" (2002, p. 1335). An Australian study conducted in 1999 found that IPV "was responsible for more ill-health and premature death in Victorian women under the age of 45 than any other of the well-known risk factors, including high blood pressure, obesity and smoking" (VicHealth, 2004, p. 8). In addressing national prevalence rates of a range of physical health conditions, potential associations with IPV must be considered. For example, CVD is the leading cause of death for NZ women, and attempts to improve these outcomes may be futile without addressing potential causes such as IPV, especially as women with severe mental illness and women who smoke are at increased risk for CVD (Heart Foundation, 2022)

Addressing IPV is inherently important irrespective of financial costs; however, it is worth noting the vast economic costs related to the issue, especially to place relative costs of prevention and intervention into perspective for policy implementation. A 2014 report measuring the economic costs of IPV against women in NZ were between $2.5 to $4.6 billion annually, and these estimates were expected to grow (Kahui & Snively, 2014). These cost estimates comprised factors relating to health, pain, suffering and premature mortality, productivity, consumption, administrative, and transfer (Kahui & Snively, 2014). More recently, the Auditor-General estimated that the NZ Government spends over $1.4 billion annually on consequences related to family violence and sexual violence (2021). Despite

inconsistencies in methodologies to estimate these figures, experiences of IPV and other types of family violence and their associated health burdens are clearly of a substantial economic and social scale.

8.8. Conclusion

Taken together, the structured literature review and data analysis present a strong case for addressing IPV and its health consequences as a priority public health issue across various policy and practice settings in NZ. This research justifies the need to identify causal pathways and moderating factors between IPV and health outcomes. This is essential in the development and implementation of prevention and intervention initiatives that strive to mitigate the long-term health and wellbeing impacts for women who have experienced IPV, and to eliminate the personal, social, and community burden of IPV and its poor health outcomes.

Chapter 9. Conclusion

The rationale for this study was derived from extensive reviews and studies reporting that the long-term physical health impacts of IPV had insofar been underexplored, especially relative to the well-studied impacts of violence on children and the effects of IPV on acute impacts (such as injury), mental health, pregnancy-related health, and infectious diseases. In light of these gaps, particularly in NZ, this study aimed to explore associations between women's exposure to IPV and physical health outcomes. This thesis was positioned to comprehensively capture current knowledge through a structured literature review, and to then leverage existing findings and gaps to inform a secondary analysis of data from the 2019 NZFVS.

This study presents valuable insight into the physical and mental health outcomes associated with NZ women's experiences of IPV. In addition to directly filling the gap for NZ-based research into IPV exposure and health outcomes, this research addressed identified weaknesses in the literature and further contributed to the international research field. This study substantiated other findings using a representative and population-based study, pre-tested and robust questionnaire based on the reputable WHO MCS, stringent sampling and data collection methodologies, and a purposefully designed analysis to address gaps and discrepancies identified in the literature.

This study extended existing findings by incorporating and analysing a range of IPV factors, including assessing the health impacts of IPV severity, IPV types (including non-physical types), and experience of multiple types of IPV. Importantly, findings highlight that non-physical IPV types (including psychological IPV and controlling behaviours) are also associated with increased risk for poor health outcomes, and that women who have experienced severe physical IPV and those who experienced multiple types of IPV are at increased risk of experiencing worse health outcomes.

These findings have significant implications for addressing the prevalence and effects of IPV in policy and practice, in NZ and internationally. The evidence derived from this study confirms that IPV is an important public health issue and should give impetus to mobilising the healthcare sector to effectively respond to IPV, for the sake of immediate safety and to improve the long-term wellbeing of women who have experienced IPV.

Appendix 1: Updated Literature Review Search Strategy

EBSCOhost Search Strategy

30/4/2021	Search Query	Additional filters	Results
Search ID #1	AB ("intimate partner violence" or "domestic violence" or "spouse abuse") AND AB ("physical health" OR "cardiovascular" OR "neurolog*" OR "endocrin*" OR "chronic disease")	**Limiters** - Scholarly (Peer Reviewed) Journals; Published Date: 20190501-20210431; Hidden NetLibrary Holdings **Narrow by Language:** - english **Search modes** - Boolean/Phrase	100
#2	AB ("intimate partner violence" or "domestic violence" or "spouse abuse") AND AB ("physical health" OR "cardiovascular" OR "neurolog*" OR "endocrin*" OR "chronic")	**Limiters** - Scholarly (Peer Reviewed) Journals; Published Date: 20190501-20210431; Hidden NetLibrary Holdings **Narrow by Language:** - english **Search modes** - Boolean/Phrase	169
#3	AB ("intimate partner violence" or "domestic violence" or "spouse abuse") AND AB ("healthcare use" OR "healthcare utili?ation")	**Limiters** - Scholarly (Peer Reviewed) Journals; Published Date: 20190501-20210431; Hidden NetLibrary Holdings **Narrow by Language:** - english **Search modes** - Boolean/Phrase	9
#4	#2 AND #3		

Scopus Search Strategy

30/4/2021	Search Query	Additional filters	Results
Search ID #1	TITLE-ABS-KEY (("intimate partner violence" OR "domestic violence" OR "spouse abuse") AND ("physical health" OR "cardiovascular" OR "neurolog*" OR "endocrin*" OR "chronic disease")) AND PUBYEAR > 2018 AND PUBYEAR < 2022	-	265
#2	TITLE-ABS-KEY (("intimate partner violence" OR "domestic violence" OR "spouse abuse") AND ("physical health" OR "cardiovascular" OR "neurolog*" OR "endocrin*" OR "chronic disease")) AND PUBDATETXT (“May 2019” OR "June 2019" OR "July 2019" OR "August	-	141

	2019" OR "September 2019" OR "October 2019" OR "November 2019" OR "December 2019" OR "January 2020" OR "February 2020" OR "March 2020" OR "April 2020" OR “May 2020” OR "June 2020" OR "July 2020" OR "August 2020" OR "September 2020" OR "October 2020" OR "November 2020" OR "December 2020" OR "January 2021" OR "February 2021" OR "March 2021" OR "April 2021") AND (LIMIT-TO (LANGUAGE , "English"))		
#3	TITLE-ABS-KEY (("intimate partner violence" OR "domestic violence" OR "spouse abuse") AND ("physical health" OR "cardiovascular" OR "neurolog*" OR "endocrin*" OR "chronic")) AND PUBDATETXT ("May 2019" OR "June 2019" OR "July 2019" OR "August 2019" OR "September 2019" OR "October 2019" OR "November 2019" OR "December 2019" OR "January 2020" OR "February 2020" OR "March 2020" OR "April 2020" OR "May 2020" OR "June 2020" OR "July 2020" OR "August 2020" OR "September 2020" OR "October 2020" OR "November 2020" OR "December 2020" OR "January 2021" OR "February 2021" OR "March 2021" OR "April 2021") AND (LIMIT-TO (LANGUAGE , "English"))	-	205
#4	TITLE-ABS-KEY (("intimate partner violence" OR "domestic violence" OR "spouse abuse") AND ("healthcare use" OR "healthcare utili?ation")) AND PUBDATETXT ("May 2019" OR "June 2019" OR "July 2019" OR "August 2019" OR "September 2019" OR "October 2019" OR "November 2019" OR "December 2019" OR "January 2020" OR "February 2020" OR "March 2020" OR "April 2020" OR "May 2020" OR "June 2020" OR "July 2020" OR "August 2020" OR "September 2020" OR "October 2020" OR "November 2020" OR "December 2020" OR "January 2021" OR "February 2021" OR "March 2021" OR "April 2021") AND (LIMIT-TO (LANGUAGE , "English"))		8
#5	#3 AND #4		

PubMed Search Strategy

30/04/2021	**Search query**	**Additional filters**	Results
Search ID #1	("intimate partner violence"[Title/Abstract] OR "domestic violence"[Title/Abstract] OR "spouse abuse" [Title/Abstract]) AND ("physical health" [Title/Abstract] OR "cardiovascular" [Title/Abstract] OR "neurolog*" [Title/Abstract] OR "endocrin*" [Title/Abstract] OR "chronic disease" [Title/Abstract])	*English, from 2019/5/1 - 2021/4/30*	100
#2	("intimate partner violence"[Title/Abstract] OR "domestic violence"[Title/Abstract] OR "spouse abuse" [Title/Abstract]) AND ("physical health" [Title/Abstract] OR "cardiovascular" [Title/Abstract] OR "neurolog*" [Title/Abstract] OR "endocrin*" [Title/Abstract] OR "chronic" [Title/Abstract])	*English, from 2019/5/1 - 2021/4/30*	153
#3	("intimate partner violence"[Title/Abstract] OR "domestic violence"[Title/Abstract] OR "spouse abuse" [Title/Abstract]) AND ("healthcare use" [Title/Abstract] OR "healthcare utilisation" [Title/Abstract] OR "healthcare utilization" [Title/Abstract])	*English, from 2019/5/1 - 2021/4/30*	11
#4	#2 AND #3		

Appendix 2: Data Extraction Form

Adapted from Cochrane's Data collection form for RCTs and non-RCTS: found at https://training.cochrane.org/data-collection-form-rcts
All extractions conducted by Brooklyn Mellar – review author

General Information

Review Title:	Associations between women's exposure to intimate partner violence and physical health
Date of data extraction:	
Publication type:	
First author, year:	
Full citation added to EndNote:	☐
Notes:	

Study eligibility

Study Characteristics	**Eligibility criteria**	**Criteria met**		
		Yes	**No**	**Unclear**
Type of study	Peer-reviewed, observational	☐	☐	☐
Date of publication	May 2019 – April 2021	☐	☐	☐
Participants	Women, IPV occurred 15+	☐	☐	☐
Types of comparison	Includes groups exposed and unexposed to IPV	☐	☐	☐
Outcome measures	Physical health; women's outcomes reported separately from men	☐	☐	☐
INCLUDE ☐ EXCLUDE ☐	Reason for exclusion:			

DO NOT PROCEED IF STUDY EXCLUDED FROM REVIEW

Study Details

	Description	Location in text
Aim/objectives		
Study Design: *(e.g. case-control, cross-sectional)*		
Design/Adaptation: *(e.g. WHO MCS)*		
Country/Countries:		
Study date/duration:		
Conflicts of interest		
Limitations:		

Participant Characteristics

	Description	Location in text
Sample setting		
Sample size *(report exposed/ unexposed where applicable)*		
Method of recruitment		
IPV prevalence *(report by type where applicable)*		
Age range		
Mean age		
Relevant sociodemographic factors		
Limitations:		

Measurements

Exposure	**Description**	**Location in text**
IPV measurement tool		
Is tool validated?	☐ Yes ☐ No ☐ Unclear	
IPV time points measured		
IPV types measured		
Outcome(s) *(copy for each outcome)*		
Outcome definition		
Outcome measurement/tool		
Is outcome tool validated?	☐ Yes ☐ No ☐ Unclear	
Control variables/ covariates		
Variable definition		
Variable measurement/tools		
Limitations:		

Findings/Appraisal

	Description	**Location in text**
Key findings of study authors		
References to other relevant studies		
Sources of bias		
Study strengths/comments:		

Appendix 3: PRISMA Checklist

Section and Topic	Item #	Checklist item	Location where reported
TITLE			
Title	1	Identify the report as a systematic review.	NA
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	NA
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	1.3, 2.3, 2.4
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	2.2
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	3.2
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	3.3
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	3.4
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	3.5
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	3.6
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	3.7
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	3.7
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	NA – 3.8
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	NA
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	NA
	13b	Describe any methods required to prepare the data for	NA

Section and Topic	Item #	Checklist item	Location where reported
		presentation or synthesis, such as handling of missing summary statistics, or data conversions.	
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	NA
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	NA
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	NA
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	NA
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	NA
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	NA
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	3.5 & Figure 3.1
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	3.5
Study characteristics	17	Cite each included study and present its characteristics.	Tables 4.1 & 4.2
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Limitations - Table 4.3 & 4.4
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Table 4.3 & 4.4
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	NA
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	NA
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	NA
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	NA
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	NA
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	NA
DISCUSSION			

Section and Topic	Item #	Checklist item	Location where reported
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	4.2
	23b	Discuss any limitations of the evidence included in the review.	5.3
	23c	Discuss any limitations of the review processes used.	5.5
	23d	Discuss implications of the results for practice, policy, and future research.	5.6
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	NA
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	NA
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	NA
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	NA
Competing interests	26	Declare any competing interests of review authors.	
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	-

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

For more information, visit: http://www.prisma-statement.org/

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