

**Interprofessional Collaboration: the attitudes of newly
graduated physicians in Oman**

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DEDICATION

To my mother Fatma and father Ibrahim, for believing in me and always supporting me to do my best and follow my dreams.

To the best sister in the whole world Wafa for always being strong, focused and getting me back on track when needed.

To my husband Hussain, the support, understanding and proudness in your eyes always kept me going and pushing harder.

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To my supervisors Professor Salman Rawaf, Professor Azzem Majeed and Professor Yahya Al Farsi for their endless work and support.

To the Ministry of Health- Oman for sponsoring my studies at Imperial College

Thank you!

DECLARATION

I declare that this thesis titled “Interprofessional collaboration: the attitudes of newly graduated physicians in Oman” and the work presented in it is my own and has been generated by me as the result of my original research. This dissertation has not been submitted to any university for the award of any degree.

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Heba Ibrahim Awadh

ABSTRACT

Interprofessional collaboration (IPC) has gained acceptance among healthcare professionals as a means to improve communication and, therefore, the quality of services provided to patients. There is limited published evidence on IPC among newly graduated physicians (NGPs), who are often confronted with academic pressure, job demands and patient safety concerns. The study sought to assess the attitudes of NGPs to IPC and examine the perceptions of healthcare professionals in Oman of the enablers of and barriers to IPC. A mixed method design was adopted to comprehensively address the exploratory and explanatory research questions. The first phase of the study consisted of an online self-administered survey of NGPs using the Jefferson School of Attitudes Toward Physician-Nurse Collaboration (JSAPNC). The survey data were analysed using SPSS software version 24. The second phase consisted of focus group discussions, with each group comprising four to eight healthcare professionals. The focus group data were analysed using the interpretive phenomenological approach with N-Vivo software version 12. The findings indicated that a general ‘collaborative spirit’ is prevalent among NGPs in Oman, with an overall JSAPNC score of 48. Male physicians expressed more favourable attitudes towards IPC and endorsed a more positive view of nurses’ contribution to the psychological and educational aspects of patient care than did their female counterparts. Male physicians also demonstrated greater agreement with nurse involvement in decisions regarding patient care and policies. The study also showed that prior knowledge of IPC impacted positively on collaboration among professionals, which in turn is likely to impact on the healthcare delivery. It is therefore necessary to implement robust strategies, such as interprofessional education (IPE) and training, to promote IPC among healthcare professionals.

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LIST OF ABBREVIATIONS

IPC: Interprofessional Collaboration

IPE: Interprofessional Education

JSAPNC: Jefferson Scale of Attitudes towards Physician-Nurse Collaboration

NGPs: Newly Graduated Physicians

GCC: Gulf Cooperation Council

SPSS: Statistical Package for the Social Sciences

IOM: Institute of Medicine

WHO: World Health Organization

JCAHO: Joint Commission on Accreditation of Healthcare Organizations

IPAS: Interprofessional Attitude Scale

CASP: Critical Appraisal Skill Programme

MoH: Ministry of Health

OMC: Oman Medical College

OMSB: Oman Medical Speciality Board

SQU: Sultan Qaboos University

SQUH: Sultan Qaboos University Hospital

FAMCO: Family and Community Medicine

JCI: Joint Commission International

NHS: National Health Services

UK: United Kingdom

IHI: Institute of Health Improvement

CSACD: Collaboration and satisfaction About Care Decisions

RIPLS: Readiness for Interprofessional Learning Scale

CASP: Critical Appraisal Skills Programme

SD: Standard Deviation

SE: Standard Error

MLRM: Multi Linear Regression Modelling

MD: Medical Doctor

MBBS: Medicinae Baccalaureus Baccalaureus Chirurgiae

DAGs: Direct Acyclic Graphs

CI: Confidence Interval

ETW: Education and Teamwork

CC: Caring versus Curing

NA: Nurse Autonomy

PD: Physician Dominance

OR: Odds ratio

IPA: Interpretive Phenomenological Analysis

DAGs: Directed Acyclic Graphs

CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1 Background

In the last two decades, interprofessional collaboration (IPC) in healthcare has become increasingly popular in many high-income countries, including the United States of America, the United Kingdom and Australia, in line with considerable empirical evidence of its positive impact on patients, family members and healthcare providers (Barnsteiner et al. 2007; Reeves et al. 2017). Patient management relies heavily on collaboration between different healthcare professionals, such as physicians and nurses (Muller-Juge et al. 2014), and effective collaboration impacts significantly on quality of care (WHO, 2010). Leading medical organisations, such as the Institute of Medicine (IOM), have emphasised the importance of teamwork in medical practice and its role in delivering high quality patient-centred care and improving health service delivery (Brasteiner et al. 2007; Speakman & Arenson 2015; Nisbet et al. 2008).

Effective IPC promotes patient-centred and family-oriented goals and values, facilitates communication among caregivers, and enhances multidisciplinary involvement in clinical decision making (IOM 2011; Tang et al. 2018). According to Speakman and Arenson (2015), health educators need to focus on collaborative practice and team-based models to ensure the population's health needs are met.

The increasing prevalence of long-term conditions associated with an ageing population, with resulting increases in co-morbidities and chronic care needs (Reeves et al. 2017; Barr et al. 2005), demands an integrated approach to promoting and maintaining population health, while improving service effectiveness for better and safer care (Xyrichis & Lowton 2007;

Fitzsimmons et al. 2014). In order to address the complex needs and challenges of healthcare, it is important for health professionals to work together in interprofessional teams (Bridges et al. 2011). IPC is seen as an innovative approach to address contemporary challenges in healthcare and has been endorsed as a means to improve professional practice, patient safety and healthcare outcomes (Zwarenstein et al. 2005; Reeves et al. 2017).

IPC is regarded as a high priority in healthcare delivery to address issues relating to patient safety and shortages of human resources, to promote efficient and effective care (Bainbridge et al. 2010) and to decrease errors in healthcare delivery (Thomas et al. 2004). It is seen as essential to improve the quality of patient care (Sullivan et al. 2015), being associated with a number of positive outcomes, including reduced patient death rates, reduced readmissions to intensive care units, decreased length of stay and reduced cost (Muller-Juge et al. 2013). It also has benefits for healthcare workers and organisations, since it has been shown to improve morale, reduce communication barriers among healthcare workers, improve the organisational culture and environment and decrease institutional costs (Thannhauser et al. 2010; Ward et al. 2008; Reeves et al. 2012).

IPC does not only affect quality of care and patient safety but also has an impact on cost effectiveness, which has become a crucial consideration in healthcare since the global financial crisis in 2008 (Reeves et al. 2010). It is increasingly acknowledged as a strategy for improving cost-effectiveness and outcomes across different healthcare settings, including primary care, emergency care and rehabilitation (Bainbridge et al. 2010). According to Speakman and Arenson (2015, p. 3), the positive relationship between professionals working in interprofessional teams addresses “the triple aim of improving health, enhancing the patient care experience, and reducing or controlling cost”.

Quality of care is influenced by the extent of IPC among different healthcare professionals (Zwarenstein et al. 2009). There is extensive evidence that healthcare provision and patient outcomes are negatively impacted by inadequate collaboration among healthcare professionals (Martin et al. 2010; Bridges et al. 2011). Ineffective collaboration results in work dissatisfaction among healthcare professionals and compromises the quality of patient care (Weller et al. 2011). Working in isolation has been found to result in duplication, delays and errors (Xyrichis & Lowton 2008), and a reduction in such practice ‘silos’ helps to decrease medical errors and enhance job satisfaction (Soones et al. 2015). Failure to work in teams delays the development of the kind of workforce required to practice in this demanding health system (Gilman et al. 2014). Interprofessional tension and misunderstanding threatens the quality of services delivered to patients in hospital settings (Lingard et al. 2004), while good working relationships among healthcare professionals help to reduce adverse events and poor clinical outcomes (Martin et al. 2010).

Successful collaboration in healthcare has been attributed to three main factors—interactional, organisational and systemic determinants (Martin-Rodrigues et al. 2005). The nature and extent of collaboration is influenced by societal roles, cultural norms and educational factors (Ward et al. 2008). A crucial criterion for successful IPC is that all members of the team should have a clear understanding of its value and purpose (Bethea et al. 2014). In future, physicians will be expected to work in interprofessional teams and to redesign their practices accordingly (Soones et al. 2015).

Despite the advocacy of professional organisations and accredited agencies, such as the Joint Commission International (JCI) for collaborative models, IPC among physicians, nurses and other healthcare personnel in most practice settings is the exception rather than the rule

(Henneman et al. 1995). Because collaboration is a two-way interpersonal process, it is important to understand individuals' attitudes to identify areas in need of improvement (Thomas et al. 2004; Amsalu et al. 2014).

1.2 Definition of IPC in Healthcare

IPC has been variously defined by researchers and health organisations. Amsalu et al. (2014, p. 1), for instance, define collaboration as “collective action towards a common goal in the spirit of trust and harmony”. According to Henneman and colleagues, collaboration

requires that individuals view themselves as members of a team, and contribute to a common product or goal. All participants offer their expertise, share in the responsibility for outcomes, and acknowledge other members of the group for their contribution to the process (Henneman et al. 1995, p. 104).

Thus, collaboration in general is directed towards performing an activity to achieve an outcome using teamwork. Collaboration requires professionals to be interdependent by sharing as well as developing true partnerships and respecting knowledge and experience rather than titles and powers (D'Amour et al. 2005). It also requires negotiations, discussions and interactions between health professionals and limiting any professional friction or rivalry (Reeves et al. 2017)

Collaboration in healthcare is defined as a “joint communicating and decision-making process with the expressed goal of satisfying the patient's wellness and illness needs while respecting the unique qualities and abilities of each professional” (Henneman et al. 1995, p. 104; see also Makaram 1995, p. 66). IPC in healthcare settings involves health professionals working together and making decisions for patient care as a team, thereby facilitating the positive transformation

of the healthcare delivery system (Angelini 2011). Baggs and Schmitt (1997, p. 78) describe physician-nurse collaboration as “nurses and physicians cooperatively working together, sharing responsibilities for solving problems and making decisions to formulate and carry out plans for patient care”. Similarly, Sollami et al. (2015, p. 223) define nurse-physician IPC as a “joint decision process in which nurse and physician share objectives and responsibility of results”.

The present study adopts the World Health Organization’s (WHO) definition of IPC as “multiple health workers from different professional backgrounds working together with patients, families, caregivers and communities to deliver the highest quality of care” (WHO 2013, p. 7). The term “interprofessional” is used in preference to other terms, such as multiprofessional, because the former indicates that professionals work together using teamwork principles whereas the latter refers to professionals alongside each other in silos with little communication (Angelini 2011). Working in silos encourages relationships based on power and hierarchies rather than respectful positive attitudes in relationships.

1.3 Interprofessional Education in Healthcare

Interprofessional education (IPE) and IPC are separate concepts but are very closely related. The skills needed for successful collaboration and teamwork among professionals are not innate, automatic or spontaneous but must to be learned (Barnsteiner et al. 2007; Ladden et al. 2006; Makharam 1995; Henneman et al. 1995). There is a consensus among educators about the importance of health professionals acquiring knowledge, skills, and positive attitudes towards safety and systems improvement as undergraduates (Ladden et al. 2006). IPE for healthcare professionals is receiving increased global attention and is unanimously advocated in the literature. IPE encourages sharing of knowledge and skills among professionals, leading to

shared values, greater understanding of the roles of other healthcare professionals, and mutual respect (Bridges et al. 2011).

IPE has been identified as a strategy for promoting IPC through cultivation of appropriate attitudes, knowledge and skills for effective collaboration and teamwork in healthcare (WHO 1998). Thus, a healthcare professional wishing to engage in IPC needs to learn how to operate competently in a multidisciplinary team (WHO 2010). The aim of IPE is to encourage interaction among different professionals as they learn together in order to improve IPC in practice (Reeves et al. 2008).

According to Reeves (2009, p. 142), “IPE aims to develop the attributes (attitudes, knowledge, skills and behaviour) required for effective collaborative practice”. International recommendations have focused on healthcare education as the means to improve collaboration and, in turn, enhance patient-centred care. Simply advising healthcare professionals to collaborate is not sufficient unless it is reinforced by training in the skills that promote collaboration in practice (Ward et al. 2008). In the United Kingdom, the Centre for Advancement in Interprofessional Education (CAIPE) has actively promoted interprofessional training and education. Similarly, the Health Council in Canada and the Department of Health and Ageing in Australia have both emphasised the importance of interprofessional learning and practice and have introduced it into their health education curricula (Bandali et al. 2010; Department of Health and Ageing 2008; Kenaszchuk et al. 2010).

Historically, health education has been profession-specific. Health professionals are taught common core values and skills but do not interact with other professionals (Inuwa 2012; Barsteiner et al. 2007). Recently, however, health professional education programmes have introduced interprofessional approaches to enhance collaboration (Abu-Rish et al. 2012). This is

because research has indicated that cooperation is enhanced if professionals learn together (Barr et al. 2005). The World Health Organization and other leading health institutes have been great supporters of interactive learning among health care professionals as this collaborative approach has a positive impact on patient safety and service delivery (WHO 2009).

However, debate continues around the timing of IPE. Some researchers argue that introducing it during undergraduate training will nurture positive attitudes towards collaboration and reduce professional rivalry, while others recommend introducing interprofessional and collaborative learning after graduation, when professional identities and roles have been established (Reeves et al. 2012). Anderson and Lennox (2009) have proposed that IPE should be introduced during undergraduate training but towards the end, as students during the early years are still in the process of developing their distinct professional identity and scope of practice.

Barnsteiner et al. (2007) argue that early introduction of IPE and its continuous incorporation in professional training are necessary to promote a culture of healthcare safety and quality. IPE reduces existing prejudices among professionals, increases awareness and understanding of the roles of other professionals, and enhances practical skills for teamwork and collaboration (Parsell & Bligh 1999). According to Lie et al. (2013), IPE provides undergraduate students with the opportunity to acquire essential communication skills and a positive attitude towards collaborative practice. Early introduction of IPE prepares students for interprofessional teamwork and its reintroduction at a later stage reinforces the knowledge and skills required for IPC (Reeves et al., 2012).

Educational redesign must begin with the understanding that the professional identity of the physician who was successful in the acute disease era of the 20th century will not be effective in the complex chronic disease era of the 21st century (Lucey 2013, p. 1639).

Most students start undergraduate training with pre-established attitudes which are largely shaped by conscious and sub-conscious personal and sociocultural beliefs (Eiser 1997; Hood et al. 2014). IPE during this specific period aims to prepare students for collaborative work in the future.

The move towards IPE was not motivated solely by communication concerns but by a number of factors, such as the ageing of the population and the shift of the burden of illness from acute to chronic care, which requires the involvement of a number of different health and social care professionals in service delivery (Reeves et al. 2008). To improve patient safety at the bedside and to bridge the gap between disciplines, IPE and training need to be a core element of the next generation of patient safety curricula for all health science schools (Barnsteiner et al. 2007). Studies have indicated that physicians and nurses alike are becoming more aware of the benefits of working together as a team for improved healthcare outcomes (Reeves et al. 2014). It is widely recommended therefore that teaching should not only focus on basic and clinical sciences, but also on the skills that are required to deal with complex conditions (Lucey 2013) and that healthcare culture should shift from the “silo” system towards collaboration (Soones et al. 2015).

1.4 Rationale for the Study

Some 30 years ago, the WHO (1988) observed that the emerging trend towards IPC in healthcare was based on assumptions. However, there is a growing body of evidence that it is more effective than working in silos (Soones et al. 2015) and that it is the most effective way of addressing the complex and challenging needs in modern healthcare (Bridges et al. 2011). There

is increasing worldwide focus on collaboration among healthcare workers in general and on physician-nurse collaboration in particular (Martin-Rodrigues et al. 2005; D'Amour et al. 1999).

Yet research has shown that professionals do not always work collaboratively in practice and that this results in suboptimal patient care (Weller et al. 2011; Reeves et al. 2008). Doctors and nurses do not always work collaboratively in healthcare settings (Weller et al. 2011), and they appear to have different understandings of collaboration (Kripalani et al. 2007). Although they work together, they do not always do so in harmony (Robinson et al. 2010), and their relationship is sometimes tense and occasionally hostile (Papathanassolou et al. 2012; Tang et al. 2018). This situation has been attributed to the historical differences in the expected roles of physicians and nurses in hospitals and the differences in status and power traditionally associated with them (Schmalenberg & Kramer 2009). It has also been explained as a result of different educational curricula and training programmes (Skjorshammer 2001).

Research has shown that physicians and nurses do not define teamwork and collaboration in the same way (Barsteiner et al. 2007; Weaver 2015). Barr (2002) attributes doctors' attitudes to the training they receive in traditional medical schools, which involves learning in silos and which focuses mainly on clinical skills of history-taking and diagnosis. This affects their willingness to engage with other healthcare professionals. Most professional training in healthcare takes place within such silos, even though graduates will be expected to work in teams (Margalit et al. 2009). As Pfaff et al. (2013, p. 6) remark, "engaging in IPC may present a daunting challenge for the new graduate nurse who is adapting to professional practice in an unfamiliar socio-cultural and political organization".

The development of collaborative practice among healthcare professionals continues to present challenges (Martin-Rodrigues et al. 2005). Professional specialisation has made it difficult for

staff members to see problems holistically due to fragmentation between professions (Xyrichis & Lowton 2008). Patients have expressed concern that, although individual practitioners are highly specialised, they do not work well together (Lucey 2013). Each profession has its own spheres of practice, which are usually rigidly circumscribed, making it difficult to collaborate (D'Amour et al. 2009). As well, the work environment presents more constraints on than opportunities for IPC (D'Amour et al 2009; Milne et al. 2015; O'Connor et al. 2016).

IPC leads to improvement in health outcomes and reduced mortality (Schraeder et al. 2001; Sollami et al. 2015). Conversely, poor collaboration among healthcare professionals results in poor patient outcomes, compromised quality of care and increased dissatisfaction and turnover among healthcare professionals (Sollami et al. 2015; Lie et al. 2010; Hughes & Fitzpatrick 2010; Callahan et al. 2006; Rosenstein & O'Daniel 2005). The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) reported that 70% of 2,455 reported sentinel events, of which 75% were fatal, resulted from failure of communication among healthcare professionals (Amsalu et al. 2014).

Despite the recommendation for IPC by various healthcare agencies and institutes, relatively little is known about the attitudes of healthcare professionals towards collaboration and the effectiveness of IPC in practice (Thannhauser et al. 2010). IPC is influenced by the attitudes of healthcare professionals towards other professionals, and negative attitudes are believed to be a cause of work dissatisfaction and poor communication (Hind et al. 2003). There is currently little empirical evidence as to the characteristics that encourage the development of collaborative practice within interprofessional teams. Thus, there is a need to explore the attitudes of healthcare professionals, especially physicians, towards IPC.

Similarly, there is limited published evidence on IPC among newly graduated healthcare professionals. The focus has mainly been on undergraduate students (Weller et al. 2011). Newly graduated physicians (NGPs) are challenged daily by academic requirements, job needs and patient safety concerns. For some new graduates, the first year of professional practice is highly stressful (Pfaff et al. 2014). There is evidence that NGPs do not feel fully prepared for practice after they finish medical school (Leisy & Ahmed 2016). Whilst they feel competent in skills such as history taking and examination, they feel less well prepared for practice in acute care, dealing with administrative issues and working in a team (Kellett et al. 2015). The transition to independent practice confronts physicians with many challenges, including responsibility towards patients and management tasks and dealing with colleagues (Westerman et al. 2010). Yet newly-qualified graduates are expected to perform with the same level of competence as experienced practitioners. This is unrealistic and can lead to burnout and an unsatisfactory working environment (Pfaff et al. 2014).

As Coster et al. (2008) point out, the “[a]ttitudes of health professionals towards their own and other professional disciplines are likely to influence their willingness to collaborate in interprofessional teams”. Attitudes can be shaped in various ways and can change with time, context and experience. Yet little is known about the attitudes of NGPs towards IPC. This study sought to add to knowledge on this topic by exploring the attitudes of NGPs towards IPC in Oman.

1.5 Health and Health Education in Oman

Oman was selected as the site for this study for three main reasons. First, it is a member of the Gulf Cooperation Council (GCC), and no previous study had been conducted in this region.

Hence the findings will provide a baseline for future research in the GCC region. Second, Oman is currently preparing for the accreditation of its medical specialty programmes, which prioritise collaboration. Third, most existing studies have been conducted in North America, Europe and Australia. There is accordingly a need to explore the influences on interprofessional collaboration from a different cultural perspective.

The Sultanate of Oman is the third largest country on the Arabian Peninsula. It provides universal health coverage for all citizens. Healthcare services are government-funded and are free for all Omanis as well as non-Omanis working in the government sector. The Ministry of Health provides the bulk of healthcare services in Oman as well as planning and developing policies and ensuring their implementation. The healthcare system is mainly based on a primary healthcare approach, with widely distributed health centres providing easy access to preventive, curative and promotive services. Regional and sub-regional hospitals provide secondary care, including surgery and obstetrics. Referral services are provided by four tertiary hospitals in the capital city, Muscat.

Remarkable achievements have been made in the Sultanate of Oman in the health sector over the past four decades, with significant improvements in the overall health of the population. This was largely due to the Sultanate's focus on building a strong healthcare workforce. However, there are still gaps to be filled, especially with regard to the 'Omanisation' of the health workforce. In spite of the number of doctors graduating each year from the various establishments, the most recent Ministry of Health report indicated that the numbers currently graduating from the various medical schools is unlikely to be sufficient to meet the needs of the population (MoH 2014). The latest reforms in the health sector emphasise the importance of interprofessional education and collaboration (White 2012). The universal health coverage in

Oman requires those physicians, nurses and other health workers to work together as a team to provide quality health care to all citizens.

1.6 Purpose of Study

The purpose of this study was to evaluate the status of IPC among NGPs by examining the attitudes towards collaboration of NGPs in Oman and identifying the factors that facilitate or hinder collaboration among NGPs.

The research process was guided by the four-dimensional model of collaboration developed by D'Amour et al. (2008), which considers the factors that facilitate or hinder collaboration. The model identifies two major factors of collaboration—relational and organisational—which allows for investigation of both team and structural elements. This study examined the four dimensions (governance, formalisation, shared goals and vision and internalisation) of collaboration as perceived by NGPs by identifying relational and organisational factors that facilitated and/or hindered collaboration among them. The Jefferson Scale of Attitudes towards Physician-Nurse Collaboration (JSAPNC) was used to assess the relationship between individual attitudes towards collaboration and a set of sociodemographic and professional characteristics.

1.7 Research Aim

The main aim of this research was to assess the status of IPC among NGPs in Oman by examining their attitudes towards IPC and their perceptions of the factors that hinder and/or enable collaboration among professionals.

1.7.1. Research Objectives

- To conduct a baseline assessment of the attitudes of NGPs in Oman towards IPC.
- To identify the association between IPC and certain sociodemographic and professional characteristics.
- To assess what health professionals perceive as the main enablers of IPC that are likely to impact on healthcare professionals in Oman.
- To assess what health professionals perceive as the main barriers to IPC that are likely to impact on healthcare professionals in Oman.

1.7.2. Research Questions

The study addressed the following research questions:

- What are the attitudes of NGPs towards IPC?
- What are the sociodemographic characteristics that contribute to successful IPC among newly graduated doctors?
- What are the professional characteristics that contribute to successful IPC among newly graduated doctors?
- What are the enablers of successful IPC among healthcare professionals in Oman?
- What are the barriers to successful IPC among healthcare professionals in Oman?

1.7.3. Research Hypotheses

H₀: There is no relation between high collaboration scores and sociodemographic and professional characteristics.

H₁: There is a relation between high collaboration scores and sociodemographic characteristics (gender and marital status)

H₂: There is a relation between high collaboration scores and professional characteristics (year of graduation, graduating university, employment location, prior knowledge of IPC and career plans).

1.8 Summary

IPE has been identified by leading health-related organisations, including WHO, as a key facilitator of IPC. Yet there is little information on IPC among new graduates. Most previous research has been conducted in high-income countries such as North America, Europe and Australia and therefore largely lacks a cross-cultural perspective. The present explorative study adopted the WHO's concept of IPC and D'Amour et al.'s (2008) four-dimensional model of collaboration to investigate collaboration among NGPs in Oman.

2.1 Introduction

This chapter presents the theoretical framework of the research, a literature review and a systematic review conducted for the purpose of this study. The theoretical framework provides the academic background of the study. The literature review assessed the tools that were used to evaluate attitudes towards interprofessional collaboration (IPC). Finally, the systematic review was conducted to identify the best available evidence on IPC, the factors that influence collaboration and the barriers to collaborative practice among Newly Graduated Physicians (NGPs). This assessment of the literature establishes the foundation on which the attitudes and perception of healthcare workers towards collaboration were subsequently investigated.

2.2. Theoretical Framework: Structuration Model of Interprofessional Collaboration

In this study, collaboration is viewed through the lens of the structuration model of IPC, also known as the four dimensional model of collaboration, developed by D'Amour, Ferrada-Videla, Sam Martin-Rodriguez and Beaulieu (2008).

The structuration model of collaboration is used to analyse the ways in which multi-level systems collaborate (D'Amour et al. 2008). It has a strong conceptual foundation in organisational theory and is supported by empirical evidence from several studies in a variety of collaborative settings, including teams, organisations and healthcare networks (D'Amour et al. 2008; Martin-Rodrigues et al. 2005). This model was chosen because it has the potential to contribute to the current reflection on collaboration and collaborative practice among NGPs. In this study, the model was operationalised to examine team/relational and organisational/structural determinants that may support or hinder the engagement of NGPs in collaboration.

The structuration model of IPC is based on the concept of collective action in organisational sociology, in particular the strategic analysis by Crozier and Friedberg (1977) and the organisational approach by Friedberg (1993). According to Crozier and Friedberg (1977), collective action is a product of the actions and behaviours of various partners. D'Amour et al. (2008) propose that health professionals are willing to work together to improve patient care as long as their personal interest and independence or autonomy are not compromised. It is this autonomy that gives them power over their colleagues.

The model considers relationships between individuals and the interactions between the relationships as well as the organisational dimension and structural factors (D'Amour et al. 2008). The model has four main dimensions and is operationalised by 10 indicators. Two dimensions involve relationships between individuals and two involve organisational settings. All dimensions are interrelated and influence each other.

The relational dimensions are shared goals and vision, and internalisation. The existence of shared goals and vision indicates that the team has a common expectation of within-team collaboration and that the main objective is to respond to clients' needs by promoting patient-centred care. This dimension has two operational indicators—clear goals and a client-centered orientation vs. other allegiances. The second relational dimension, internalisation, indicates that professionals are aware of their interdependencies and the importance of managing them. This translates into knowledge of each other's values and mutual trust, which enhances the sense of belonging among them. This dimension's operational indicators are mutual acquaintanceship, both personally and professionally, in order to understand each other and develop common objectives, and trust in each other's competencies and ability to handle their responsibilities.

The organisational dimension includes formalisation and governance. Formalisation refers to the availability of organisational policies and procedures to regulate actions by strengthening the structure. It clarifies the roles and responsibilities of the professionals in the organisation. This dimension has two operational indicators: formalisation tools, or the policies and procedures that define responsibilities and their distribution among professionals, and information exchange, which requires an appropriate infrastructure that allows for effective sharing of information, which is necessary for trust, mutual agreement, collaboration and appropriate patient management.

Governance refers to the role of higher managers and leaders in supporting and promoting collaboration and innovative collaborative practice. This includes both central and local leadership, in addition to expertise and connectivity. The four indicators within this dimension are centrality, leadership, support for innovation and connectivity. Centrality refers to the availability of a clear direction and guidelines with regard to collaboration and the implementation of appropriate strategies and structures to facilitate it among professionals within the organisation. Leadership includes both local leaders, such as managers, who are necessary to take the collaborative initiative forward; and central leaders, who provide a strong central authority and play a strategic role in promoting collaborative practice. Connectivity refers to the fact that both individuals and organisations are interconnected; it is facilitated by the availability of settings within which discussion can take place and bonds can be constructed. Support for innovation involves support for changes in clinical practice that promote corroborate collaboration.

Overall, the model indicates that collaboration is based not only on interactions among professionals but also on organisational factors, such as supportive leadership, as well as social

and political influences. Figure 2.1 illustrates the structuration model, with the relational dimensions shown on the right and the organisational dimensions on the left.

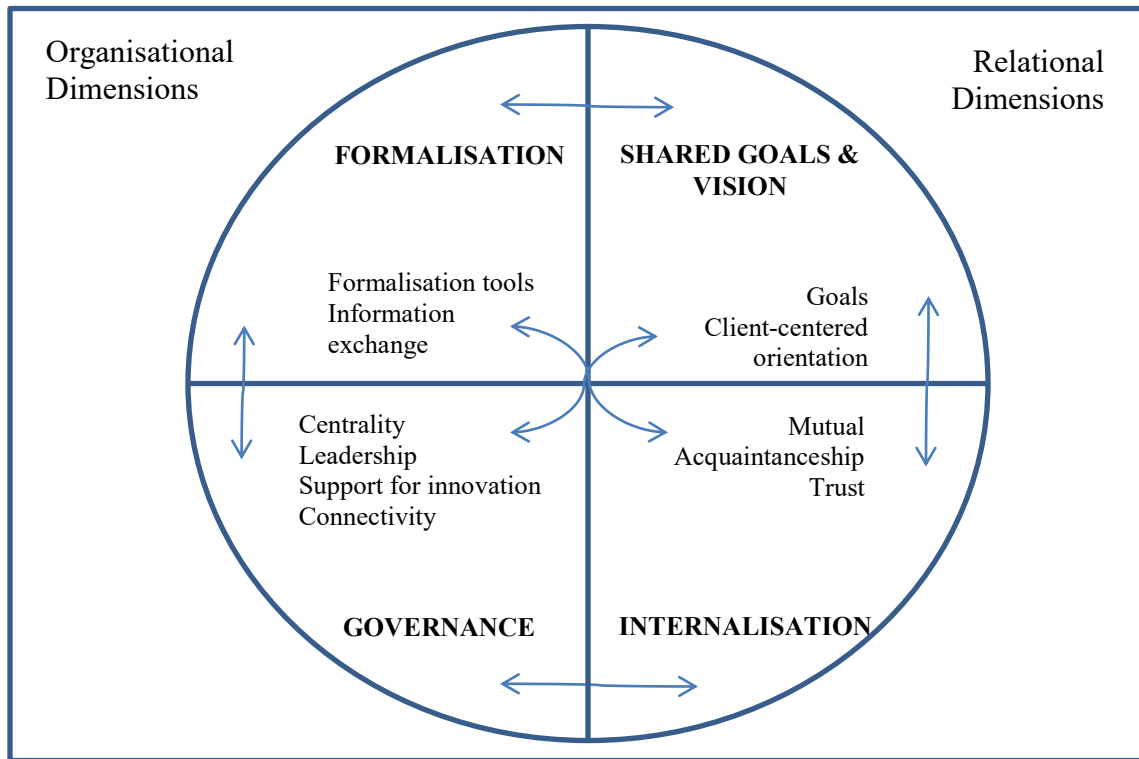


Figure 2.1 Structuration model of collaboration.

The model identifies the processes and components required for successful collaboration among professionals. A typology was derived from the model of collaboration taking into account the degree of collaboration; collaboration in action, collaboration in construction and collaboration in inertia.

This study will be conducted in two phases in which phase one the quantitative research will assess the outcome variable by assessing the attitudes of NGPs towards IPC taking into account

certain individual variables such as sociodemographic and professional characteristics. And the second phase of the study will assess the factors that influence collaboration positively or negatively based on the structuration framework. However, will the presence or absence of these factors will affect the attitude towards collaboration.

2.3 Review of IPC Perception Tools

This section reviews the literature on the instruments that have been used to evaluate IPC. Its purpose is to identify the most appropriate instrument for evaluating the attitudes of NGPs towards IPC. A well-constructed quantitative study requires a data collection tool with well-developed psychometric properties (Thannhauser et al. 2010) to ensure that the research is conceptually and methodologically sound. Hence, it is important to identify a well sounded psychometric property of the questionnaire tool to be used in this study.

Despite the acknowledged importance of the topic, few published studies have included detailed information on the psychometric properties of their questionnaires and the validity and reliability of the tool. This makes it difficult for other researchers to conduct comparable studies (Mackay 2004). The following section presents a review of relevant literature.

2.3.1 Search strategy and selection of studies

The review of literature was undertaken to identify the best available tool to measure the attitudes of NGPs toward IPC. All relevant literature published from 1964 to May 2016 was reviewed. The instruments included are presented in Table 2.1.

Table 2.1 *Interprofessional Collaboration Instruments*

Instrument	Source	Conceptual Framework
Perception of Interprofessional Collaboration Model	Odegard (2006)	Based on the 3 levels of collaboration—individual, group and organisational—used in organisational psychology (French & Bell, 1990).
Multiple-group measurement scale for interprofessional collaboration	Kenaszchuk, Reeves, Nicholas & Zwarenstein (2010).	Adapted from Nurse’s Opinion Questionnaire (Lake 2002).
Attitudes to Health Professionals Questionnaire	Lindqvist, Duncan, Shepstine, Watts & Pearce (2005).	The scale was developed through a “construct exercise” that elicited a number of bipolar constructs.
Role Perception Questionnaire	Stuart (2009).	The repertory grid technique was used to produce the attitude items for the questionnaire, based on personal construct theory.
Interprofessional Attitude Scale (IPAS)	Norris, Carpenter, Eatom, Guo, Lassche, Pett & Blumenthal (2015).	Based on the framework of interprofessional core competency domains.
Collaboration and Satisfaction with Care Decisions (CSACD)	Baggs. (1994).	Based on conceptual model of collaboration for conflict resolution and organisational theory (Thomson 1967).
Jefferson Scale of Attitudes towards Physician Nurse Collaboration (JSAPNC)	Hojat, Fields, Veloski, Griffiths, Cohen, & Plumb. (1999).	Based on the rationale that interprofessional collaboration is a joint endeavour; examines authority, responsibility, communication and decision making.

2.3.2 Evaluation of IPC instruments

Two systematic reviews of the literature on IPC were particularly relevant. Each is discussed below.

Dougherty and Larson (2005) evaluated the strengths and weaknesses of the instruments used to measure collaboration between doctors and nurses. They identified five instruments. The Collaborative Practice Scale (Wiess & Davis 1985) focused on interactions between

professionals to resolve conflicts and make decisions. The Collaboration and Satisfaction about Care Decision Scale (Baggs 1994) focused on shared responsibility and open communication between professionals. The ICU Nurse-Physician Questionnaire (Shortell et al. 2001) included communication between professionals, culture and organisational climate and leadership skills. The Nurses Opinion Questionnaire (Adams et al. 1995) considered nurse satisfaction, patient outcomes, organisational structure and communication. The Jefferson Scale of Attitudes towards Physician Nurse Collaboration (Hojat et al. 1999) focused on teamwork, education, communication and authority. The authors of the systematic review assessed the reliability and validity of the tools and recommended them for use in future research on collaboration. However, each study used a different definition of collaboration and some tools focused mainly on nurses.

Thannhauser et al. (2010) conducted a review of quantitative measures used in the interprofessional literature. The aim was to identify questionnaires that could be used to assess IPC in both healthcare and academic settings. However, due to confusion in the terminology, the review included tools related to interprofessional education (IPE) as well as IPC. The review identified 23 instruments. Of these, only eight attempted to develop their psychometric properties. Six of the eight instruments were used in only one or two studies, limiting the information available about the utility of the tool. These six instruments were: the Index of Interdisciplinary Collaboration (Bronstein 2002), the Multidisciplinary Collaboration Instrument (Carroll 1999), the Interprofessional Perception Scale (Ducanis & Golin 1979; Golin & Ducanis 1981), the Role Perception Questionnaire (Mackay 2004), the University of Western England Interprofessional Questionnaire (Pollard, Miers & Gilchrist 2004, 2005), and the Modified Index of Interdisciplinary Collaboration (Oliver, Wittenberg-Lyles & Day 2006, 2007). Two of the

eight instruments—the Readiness for Interprofessional Learning Scale (Parsell & Bligh 1999) and the Interdisciplinary Education Perception Scale (Luecht et al. 1990)—have been used extensively in the literature, making it easier to explore their reliability. Although the aim of these two questionnaires was to measure students’ readiness for interprofessional learning and their attitude towards education rather than collaboration (Linqvist et al. 2005), they have been used in studies of qualified professionals, including doctors. However, these tools have not yet attained the highest levels of validity (Mackay 2009), and the test-retest reliability of certain elements of the Readiness for Interprofessional Learning Scale (RIPLES) has not been verified (McFadyen et al. 2006).

The authors of both systematic reviews identified the need for broader tools covering professionals other than physicians and nurses (Dougherty & Larson 2005; Thannhauser et al. 2010).

The literature review conducted for this study identified other inter-professional collaboration perception tools that were not included in these earlier reviews. The seven of most relevance in to the present context are discussed below.

Odegard (2006) developed the Perception of IPC Model to capture the complexity involved in the collaboration process as perceived by professionals. The model conceptualises IPC as occurring on three levels—individual, group and organisation. This tool was piloted on a small sample of paediatric mental health professionals including teachers, educators and medical doctors. Since its validity has not been established via follow-up in-depth interview, it was not considered for this study.

The Multiple-group Measurement Scale for IPC (Kenaszchuk et al. 2010) was adapted from the Nurse’s Opinion Questionnaire. The tool was used with nurses to evaluate physicians, and with

other health professionals (including physicians) to evaluate nurses. The scale focused on three main factors—communication, accommodation and isolation. However, its use with a single profession meant that it was not considered appropriate for this study.

The Attitudes to Health Professionals Questionnaire (Lindqvist et al. 2005) is another measure used to assess interprofessional attitudes in the healthcare system. It is a 20-item questionnaire which was developed initially to measure the attitude of students towards health professionals; it has good internal consistency and acceptable test-retest reliability. In the second stage of its development, some weak items were identified and removed to improve the internal consistency of the tool. However, preliminary validation and cross-validation still need to be conducted. It was therefore excluded from this study because its focus was on students rather than healthcare professionals.

The Role Perception Questionnaire (Mackay 2004) was developed to measure the change in role perception of a range of professions. It has acceptable validity and reliability and could be used to assess the perception. However, it has only been validated among undergraduate students and the author recommended that it be evaluated in-depth before being used for professionals. Hence it was not considered suitable for this study.

The Interprofessional Attitude Scale (IPAS) was developed based on the core competencies required for IPC. IPAS is an expanded version of RIBLES and comprises a 27-item questionnaire with five subscales: teamwork, roles and responsibilities, patient-centeredness, interprofessional biases, diversity and ethics and community centeredness. The validity of the tool has been positive. However, no evaluation of this scale has been conducted in a postgraduate setting so it was not considered appropriate for this study (Norris et al. 2015).

The Collaboration and Satisfaction about Care Decisions (CSACD) instrument (Baggs 1994) was developed to assess the quality of interaction in care decision making and satisfaction with the decision-making process in health settings. It was assessed among ICU nurses and resident physicians, but further psychometric analysis was suggested. Hence, it was not considered suitable for this study.

For the present study, the Jefferson Scale of Attitudes towards Physician Nurse Collaboration (JSAPNC) was considered most appropriate because it showed good internal consistency and acceptable test-retest reliability in evaluations of nursing and medical professionals' attitudes towards collaboration (Hojat et al. 2003; Ward et al. 2008). The instrument has also been used in different settings and cross-culturally among practitioners and students and has acceptable psychometric properties (Brown et al. 2014; Hojat et al. 2001).

JSAPNC was originally developed to measure nurse-nurse collaboration (Hojat & Herman 1985) and, later, physician-nurse collaboration (Hojat et al 2003; Ward et al. 2008). It has since been used to measure attitudes towards IPC among various types of healthcare professionals with adequate psychometric properties (Edelbring et al. 2018).

It consists of 15 items using a 4-point Likert scale, with higher values indicating strong agreement. The attitudes towards collaboration are reflected by the total score, ranging from 15 to 60. The higher the score, the more positive is the attitude towards IPC, and vice versa.

The JSAPNC has four subscales: (i) shared education and teamwork (7 items); (ii) caring versus curing and nurses' autonomy (3 items each); and (iii) physicians' dominance (2 items). A higher factor score on shared education and teamwork indicates a greater orientation towards collaborative learning and training. A higher factor score on caring as opposed to curing indicates a more positive view of nurses' contributions to both psychological and educational

aspects of care. A higher factor score towards nurses' autonomy indicates more agreement with nurses' involvement in decision making regarding patient care and hospital policies. A higher factor score on physicians' dominance indicates a rejection of the dominant role of physicians in patient care. The score for physicians' dominance is reversed.

Nonetheless, some shortcomings of the JSAPNC have been identified. The first concerns the item assignment for the different factors. Most of the items address shared education and teamwork (7), followed by caring versus curing (3) and nurse autonomy (3), whereas only two items relate to physician dominance (Edelbring et al. 2018). This may be of particular concern in contexts where the relationship between physicians and nurses is a major consideration. In this study, however, the main focus is on attitudes towards collaboration rather than the collaboration process itself.

Second, the model largely focuses on physicians and nurses, neglecting the perspectives of other professions and patients (Edelbring et al. 2018). However, the focus here is on evaluating the attitudes of NGPs towards IPC, so its use was considered to be appropriate. Another tool should be used in studies of patients.

Third, two Swedish studies indicated that the wording of some items was ambiguous. The expert groups reacted negatively to the wording of some items, which they found to be awkward in relation to their educational context and to imply the existence of a stronger professional hierarchy than the one they knew from their own practice in Sweden (Edelbring et al. 2018; Hansson et al. 2010).

Fourth, although the internal consistency estimates for the total scale were reported as moderate to high, low exploratory factor analysis (EFA) levels were reported for some individual questions (Ward et al. 2008; Yildirim et al. 2004). Hence most studies have used it as a multidimensional

rather than unidimensional scale (Dougherty & Larson 2005; Brown 2006; Tabachnick & Fidell 2007). Although concern has also been expressed in relation to how the scale addresses interprofessional learning aims (Edelbring et al. 2018), the JSAPNC is considered appropriate for investigating profession-specific attitudes towards collaboration.

On the whole, global psychometric assessment of the Jefferson Scale of Attitudes towards Physician-Nurse Collaboration indicated that the overall reliability and validity of the tool were high and it was suitable for use among both physicians and nurses, especially in view of its cross-cultural and multi-level use in multiple countries. Hence, the Jefferson Scale was used for this study. Table 2.2 summarises the evaluation of all the cited instruments.

Table 2.2 *Evaluation of Interprofessional Collaboration Instruments*

<i>Instrument</i>	<i>Reliability</i>	<i>Validity</i>	<i>Psychometric properties</i>	<i>Target sample</i>	<i>Applicability</i>	<i>Summary Score</i>
Perception of Interprofessional Collaboration Model	✓	x	✓	✓	✓	4/5
Multiple- group measurement scale for interprofessional collaboration	✓	✓	✓	x	x	3/5
Attitudes to Health Professionals Questionnaire	✓	✓	✓	x	x	3/5
Role Perception Questionnaire	✓	✓	✓	✓	x	4/5
Interprofessional Attitude Scale (IPAS)	✓	✓	✓	x	x	3/5
Collaboration and satisfaction with Care Decisions (CSACD)	✓	x	x	✓	x	2/5
Jefferson Scale of Attitudes towards Physician Nurse Collaboration	✓	✓	✓	✓	✓	5/5

2.4 Factors Influencing IPC among NGPs: Systematic Review

The objective of this systematic review was to gain insight into the factors that are important for successful collaboration. The review critically analysed the barriers to and facilitators of IPC in relation to NGPs. This review addressed two questions:

- I. What are the facilitators of IPC among NGPs?
- II. What are the barriers to IPC among NGPs?

2.4.1 Search criteria

A comprehensive multistep search of MEDLINE, EMBASE, PsycINFO and Cochrane electronic databases was conducted. This was followed by a search in Google Scholar as well as hand searches of relevant journals. Both qualitative and quantitative peer reviewed articles, published in English, were searched. The review was conducted on the published literature from 1964 until January 2020.

Numerous search terms were used at the beginning of the search to reflect the variety of terms used in the literature. For example, for the word “interprofessional”, other terms included “multiprofessional”, “transprofessional”, “interdisciplinary”, “multidisciplinary” and “transdisciplinary”. For the word collaboration, “coordination”, “teamwork”, “sharing”, “team”, “relationship” and “partnership” were included, and for “new graduates” the search included “novice”, “graduate”, “1st year foundation” and “entry to practice”. The terms used in the Medline search are shown in Table 2.3

Table 2.3 *Terms Used in Search Engine*

<i>“Newly graduated doctors and interprofessional collaboration”</i>		
“Newly Graduated”	“Factors”	“Collaboration”
PubMed [mesh] education, medical, graduate [mesh] education graduate Ovid “new graduate” “new-graduate” “recent graduates” “recently graduated” “novice” “foundation year one doctors”	[mesh] attitude of health personal Attitude Perception “Doctors attitude”	PubMed [mesh] interprofessional relations [mesh] medical etiquette [mesh] cooperative behaviour [mesh] interdisciplinary communication Ovid Inter-profession or interprofession Inter-discipline or interdiscipline Inter-occupation or interoccupation Inter-institute or interinstitute Inter-agent or interagent Inter-sector or intersector Inter-department or interdepartment Inter-organization or interorganization Interprofessional relations adj collaboration transprofessional Multi-profession or multiprofession Multi-discipline or multidiscipline Multi-occupation or multioccupation Multi-institute or multiinstitute Multi-agent or multiagent Multi-sector or multisector Multi-department or multidepartment Multi-organization or multiorganization team Patient care team

2.4.2 Inclusion criteria

The review included English-language qualitative and quantitative peer reviewed studies with clearly stated methodology. It included theoretical papers as well as empirical studies in primary and tertiary settings and focused on IPC among NGPs, including first year graduates, interns and residents. It considered studies that examined enablers of and challenges to collaboration among this category as well as the influence on the quality of care provided to patients. The review excluded studies involving medical students or senior doctors and studies that did not address collaboration. The inclusion and exclusion criteria are shown in Table 2.4.

Table 2.4 *Inclusion and Exclusion Criteria*

Inclusion criteria	Exclusion criteria
Registered newly graduated doctors, residents	Medical students, senior doctors, Physician Assistants
Outcomes reflective of barriers to and/or facilitators of interprofessional collaboration	Outcomes not reflective of barriers to and/or facilitators of interprofessional collaboration
Any study in English	Editorials or opinion pieces Studies not in English

2.4.3 Study selection

A comprehensive multistep systematic search was conducted by two reviewers individually (HA & YF). A total of 2017 studies were identified from all the databases. A total of 1829 papers remained after 188 duplicates were removed. The two reviewers independently screened title and abstract of the studies and identified 69 articles for full text screening after excluding 1760 papers. The full-text review was also done independently according to the inclusion/exclusion criteria. Any disagreement on the eligibility of a paper was discussed and resolved by a third reviewer (TG). A total of 9 studies were identified as fulfilling the criteria and therefore eligible for inclusion. The process of selection is shown in Figure 2.2.

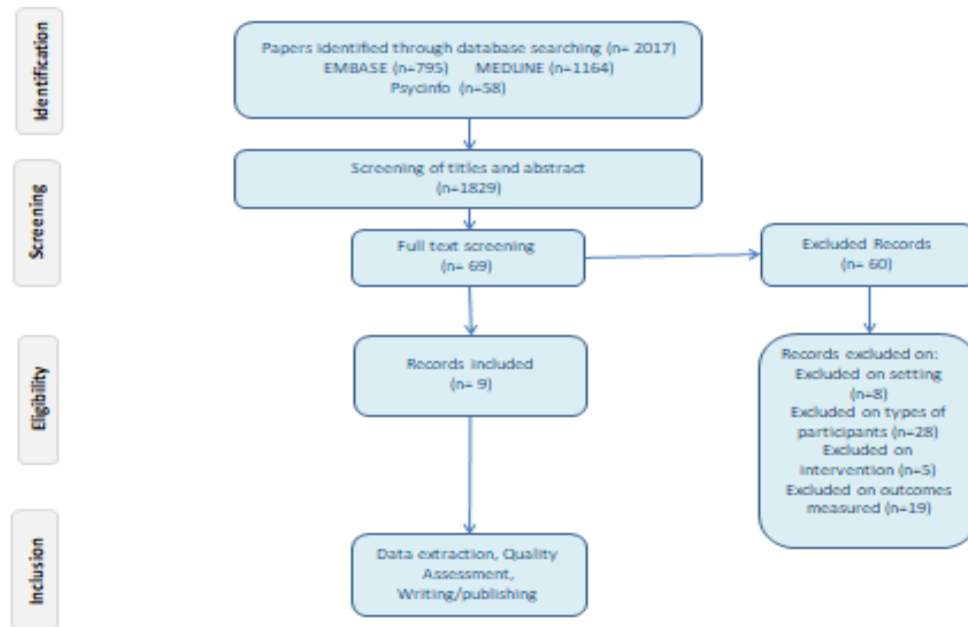


Figure 2.2 PRISMA flow diagram.

2.4.4 Quality assessment of included papers

After eligibility had been determined, a quality assessment was conducted based on the CASP checklist (Appendix 1) prior to data extraction. The data extracted were: author's name, year, title, study design (including type of study, study population and number of participants) as well as main findings and conclusion. The studies were independently appraised using the CASP checklist by two reviewers (HA & YF). Disagreements were discussed and resolved with the assistance of a third reviewer (TG) if required. Some of the primary outcomes of this study were: barriers to or/and facilitators of IPC and effects of collaboration on physicians.

The results are described in Table 2.5.

Table 2.5 *Characteristics of Selected Studies in the Systematic Review*

Author and Year	Title	Study Design	Results & Significant Conclusions	CASP Quality Assessments
Baggs & Schmitt (1997)	Nurses' and resident physicians' perceptions of the process of collaboration in an MICU	Qualitative study Individual interviews 20 participants (10 nurses & 10 residents) Hospital based	Two major antecedent condition required before collaboration; being available (place, time, knowledge) & being receptive (interest, discussion, respect & trust) Factors hindering collaboration: Residents; too busy, aggressive responses and not following orders Nurses: arrogance and disinterest.	7/10
Thomas et al. (2004)	Working together in the neonatal intensive care unit: provider perspectives	Qualitative study Focus groups 36 participants (6 residents, 3 attending physicians, 7 staff nurse, 6 fellows, 3 transport nurses, mixed provider 4 & 7) Hospital based	Workplace factors (staffing, workplace environment) Provider characteristics (personal attributes, reputation & expertise) Group influence (communication, relationships, teams)	7.5/10
(Wear & Keck-McNuly) 2004	Attitudes of female nurses and female residents towards each other: a qualitative study in one US teaching hospital	Qualitative study Focus group 51 women (28 nurses, 23 residents)	Focuses on the effect of (female) gender on collaboration	8/10
Barker & Oandasan (2005)	Interprofessional care review with medical residents: lessons learned, tensions aired- a pilot study	Qualitative study Individual interviews & focus groups 10 family physicians (6 in feedback) Primary care	Knowledge Understanding professional role Personal development Shift in negative preconception of faculty members	7.5/10
Weller et al. (2011)	Interprofessional collaboration among junior doctors and nurses in the hospital setting	Qualitative study Individual interviews 13 doctors, 12 nurses Hospital based	Quality of collaboration (: Mutual respect and trust, Barriers created by the organisational structure or culture) Shared mental models: How information is shared Team coordination: Defining roles within teams; coordinating decision making across the patient care team; team leadership; orienting new team members Communication: openness to communication Speaking up	8/10

Milne et al. (2015)	An ethnographic investigation of junior doctors' capacities to practice interprofessionally in three teaching hospitals	Observational study of six doctors. Hospital based	Limitations to interprofessional relationship Lack of professional cultural diversity Roles constrained by daily stresses. Structural constraints as junior doctors are not constants in wards. Time constraints and lack of respect. Current training system of junior doctors inhibits collaboration.	7.5/10
Soones et al. (2015)	Internal medicine residents' perceptions of team-based care and its educational value in the continuity clinic: a qualitative study	Qualitative study Focus groups 77 residents Hospital based	Structural factors (communication, residents' schedule, team meetings) Human resources (team role & stability) Political (resource scarcity and conflict) Symbolic (organisational beliefs)	7.5/10
O'Connor et al. (2016)	A mixed-methods study of the causes and impact of poor teamwork between junior doctors and nurses	Qualitative study. Critical incident technique interviews 28 junior doctors & 8 nurses Hospital based	Five teamwork scenario failures were identified Poor quality of collaboration Lack of coordination Lack of shared mental models Poor communication Poor leadership	7/10
Tang et al. (2018)	Interprofessional collaboration between junior doctors and nurses in the general ward setting: a qualitative exploratory study	Qualitative study Individual interviews 11 physicians and 8 nurses Hospital based	Working towards better patient care (effective communication, understanding of nurses' professional roles) Struggling to cope (heavy clinical workload, competing priorities, Organisational constraints) Interpersonal relationships (medical dominance and nursing subservience, building relationships) Nurses to take on more responsibilities (be given more autonomy, be more confident, be proactive)	7.5/10

2.4.5 Outcomes measured

Nine articles were included in this review. A systematic and iterative approach was applied to extract, categorise, draw conclusions and verify results (Pfaff et al. 2013). Due to the nature of the topic, eight studies adopted a qualitative approach and one was an observational study. One study used critical incident technique interviews (O'Connor et al. 2016), three studies used semi-structured interviews (Baggs & Schmitt 1997; Weller et al. 2011; Tang et al. 2018), three used focus groups (Soones et al, 2015; Wear & Keck-McNulty, 2004; Thomas et al. 2004), one used semi-structured interviews followed by a focus group (Baker & Oandasan 2005) and one was an observational study (Milne et al. 2015).

Seven of the studies were conducted in a hospital setting and all explored the views of NGPs or residents and other health care professionals, including nurses and/or other physicians. One of these studies included only women to explore the role of gender in interprofessional relationships (Wear & Keck-McNulty 2004). Only two studies were conducted in clinics and both only evaluated the perceptions of residents (Soones et al. 2015; Baker & Oandasan 2005).

Although the purpose of all the studies was to evaluate IPC, they used different definitions. Tang et al. (2018) defined collaboration as “interprofessional working relation between a physician and nurse in making shared decisions for patient care, and sharing the responsibility and power to manage patient care”. Three studies defined it as interprofessional team-based care, focusing on teams and how they work together (Soones et al, 2015; Weller et al, 2011; O'Connor et al. 2016). Baker and Oandasan (2005) did not define IPC but discussed the concept with participants, who did not fully understand it. One participant, for instance, defined it as “a situation where more than one person is involved in the patient’s care”. Baggs and Schmitt (1997) noted that different providers defined collaboration differently, and they identified clear

aims for their study. Thomas et al. (2004), Wear and Keck-McNulty (2004) and Milne et al. (2015) did not provide any definition of the concept they were discussing.

This review drew on the evidence from these studies to identify the facilitators of and barriers to collaboration in order to better understand their interconnectedness. The structuration model of IPC (D'Amour et al. 2008) and Bronfenbrenner's (1977, 1979) ecological framework was used to explore the factors affecting NGPs' collaboration at micro (individual), meso (team/relational), and macro (organisational/ structural) levels of practice. These frameworks were employed to develop a comprehensive understanding of NGPs' experiences and their engagement with others and to help identify the levels at which support and skills development are needed.

2.4.6 Facilitators of and barriers to NPGs' engagement in IPC

2.4.6.1 Organisational/ structural factors (macro level)

One of the main factors identified in all the studies was communication. Openness in interpersonal dealings makes others feel more willing to engage (Weller et al. 2011) and, as one doctor commented, it “tended to help the whole environment of the team”. This was believed to lead to better continuity of care (Soones et al. 2015). Both face-to-face and electronic communications were considered, with the latter being controversial. Some considered it a better form because it allowed the entire team to receive the information. Others, however, expressed the view that lack of familiarity with the person on the other side made it difficult to trust that the task would be completed (Soones et al. 2015).

Effective communication was associated with specific factors such as providing clear information and explanations to help the other party (Tang et al. 2018). At the same time, one

resident commented that nurses sometimes “behave aggressively, telling residents what to do, which caused them to become defensive and withdraw” (Baggs & Schmitt 1997). Poor communication was also emphasised by O’Connor et al. (2016) as a causal factor leading to failure to share information between nurses and junior doctors.

Another factor highlighted by most studies was the need for clear goals for the team as well as clear responsibilities and knowledge about each other. This was highlighted by four of the nine studies (Baggs & Shmitt 1997; Soones et al. 2015; Weller et al. 2011; Tang et al. 2018). For example: “when providers knew about each other’s roles and responsibilities, they had a better version of what the other had to offer in collaborating and what limitation might be present” (Baggs & Schmitt, 1997) and “let the nurses know what their objectives are and what the nurses can help with” (Tang et al. 2018).

The organisational structure and culture was mentioned by five of the nine studies (Thomas et al. 2004; Weller et al. 2011; Soones et al. 2015; Milne et al 2015; Tang et al. 2018). The organisational structure was seen as a barrier in facilities where nurses are located in one ward while junior physicians move around and work for different people, “trying to do jobs for six different bosses who all want different things, who have different patients in different wards and, yeah, that didn’t work” (Weller et al. 2011). This led in some instances to junior physicians perceiving nurses as being obstructive and increased their frustration (Milne et al. 2015).

Human resources, including staffing levels, were raised in two of the nine papers (Thomas et al. 2004; Soones et al. 2015). According to one resident, this affected the staff workload and the ability to complete the task in a timely manner in addition to their actual work as well as extra tasks from different teams (Soones et al. 2015). However, junior physicians pointed out that

having too many orders to obey was equally problematic: “there may be no prioritisation, too many orders being shouted” (Thomas et al. 2004).

The importance of a strong supportive leadership was mentioned in two studies (Weller et al 2011; O’Connor et al. 2016). It was important not only to ‘buy in’ to the concept of interprofessional teams but also to identify the leader of these teams, as the leadership of medical and nursing teams was clearly established. As one junior physician suggested: “[U]nite everyone and make, you know, make them realise that they are working as part of a team” (Weller et al. 2011). Poor leadership, on the other hand, was synonymous with a lack of patient-focused care due to frustration between junior physicians and nurses, leading to poor care for patients (O’Connor et al. 2016)

2.4.6.2 Team/ Relational factors (meso level)

Having teams and regular team meetings was another important factor that was discussed in five of the nine papers (Baggs Schmitt 1997; Thomas et al. 2004; Weller et al. 2011; Soones et al. 2015; O’Connor et al. 2016) as this was considered an opportunity to build relationships and improve team processes. Teams were described based on different disciplines but they were all considered necessary for patient care coordination: “collective minds offer better care, when decisions are made together”, as one doctor put it (Thomas et al. 2004). Some physicians emphasised that, in order for teams to run smoothly, there should be clearly identified roles, job responsibilities should be identified for team members and there should be mutual respect among them (Thomas et al. 2004). Knowing their team members was also said to make it “much easier to do my job and more enjoyable” (Soones et al. 2015).

Few physicians felt that they were not part of the team (Soones et al. 2015). They attributed the success of the team to the personalities, attitudes, knowledge and skills of the people involved

(Thomas et al. 2004). Nonetheless, even when a team-based model was in place, residents felt that they were mainly responsible for patient care and that, if a task was not done, they would be held responsible (Soones et al. 2015) by both other team members and the administration, as residents were expected to “plug all the holes” (Soones et al. 2015). According to one physician, “the nurses are a team and the doctors are a team ... [but] often they don’t actually necessarily work together all that well” (Weller et al. 2011). In one study, NGPs expressed the view that nurses may work well together as a team but when it came to dealing with interns, they tended to ‘gang up’ on the interns; as a result, the interns felt compelled to perform a task to keep the nurses happy rather than because it was necessary for the patients (O’Connor et al. 2016).

Two studies noted that there are frequent changes among junior doctors due to departmental rotations and inconsistent scheduling of shifts (Baggs & Schmitt 1997; Weller et al. 2011). This affected the stability of the team. Comments included: “[T]rust takes time to develop ... we move around every 3 months or so ... it’s always a bit nerve-racking” (Weller et al. 2011) and “[R]eally you just get yourself oriented and you are out of there” (Baggs & Schmitt 1997). Hence residents do not have enough time to apply what they have learned as part of a collaborative team (Baggs & Schmitt 1997). This could be addressed by implementing orientation programmes about ward policy and protocols (Weller et al. 2011).

2.4.6.3 Individual factors (micro-level)

Individual characteristics were raised in five of the nine papers (Baggs & Schmitt 1997; Wear & Keck-McNulty 2004; Thomas et al. 2004; Milne et al. 2015; Tang et al. 2018). One of these only investigated female professionals (Wear & Keck-McNulty 2004). The personal attributes identified included power, competitiveness, values, beliefs, gender, confidence, interest, trust, respect, being approachable and being available.

Junior female physicians expressed the view that they had to be “nicer” and more “accommodating” with female nurses as opposed to male junior physicians: “I have to be ten times more efficient, ten times nicer, ten times more interested in their personal lives ... to get the same job done” (Wear & Keck-McNulty 2004). Being approachable was identified by female physicians as both a positive and negative factor: “female physicians were probably viewed by nurses as more approachable, but with that comes being more attackable” (Wear & Keck-McNulty, 2004).

Trust and respect were discussed in detail. Respect was associated with “politeness, manners, being diplomatic and pleasant” (Baggs & Schmitt 1997). Active listening and questioning were also considered part of mutual respect. Trust was significant because it affected confidence in and interaction with co-workers (Thomas et al. 2004). However, nurses stated that some NGPs showed lack of respect for their opinions and clinical judgment (O’Connor et al. 2015), suggesting that this may be due to an unconscious lack of sensitivity to others in the team and time constraints (Milne et al. 2015).

Female junior physicians felt they had to work harder to gain nurses’ trust and respect: “[I]t took us a year to win [nurses’] confidence ... I feel like I have to work overly hard to get their respect and establish that when I write an order” (Wear & Keck-McNulty 2004). Some female physicians felt they were not respected at all, as some nurses “can address them in a way that they would never use with male residents” (Wear & Keck-McNulty 2004). This led to NGPs feeling pressure from the many competing demands, as well as the challenges of dealing with the lack of appreciation and recognition from the nurses (O’Connor et al. 2016).

The NGPs also raised the issue of the effect on interpersonal relationships between physicians and nurses of the traditional culture of medical dominance and nursing subservience (Tang et al.

2018). This led to unhappiness and unwillingness among both nurses and physicians to work together. Hence, some doctors suggested, “I think we could hang out together... one way of really breaking down the boundaries” (Tang et al. 2018).

Expertise, including knowledge, skills, certification and education, was identified as a positive factor that helped to build respect and collaboration (Thomas et al. 2004). NGPs suggested that nurses should take more responsibility by being more confident and more proactive in relation to patients’ wellbeing and care planning: “nurses should be more confident; I mean they are health professionals ... so provide us (physicians) with an input and assessment” (Tang et al. 2018).

2.4.7 Conclusion

Table 2.6 summarises the key findings of this review, which is the first to focus on NGPs in the context of IPC. As such, it fills a gap in current knowledge of the topic based on literature that is of moderate to strong quality.

Table 2.6 *Facilitators of and Barriers to Interprofessional Collaboration*

<i>Analytic Themes</i>	<i>Descriptive Themes</i>	
	Facilitators	Barriers
Organisational (Macro) Factors	Communication	Poor communication
	Good staffing Clarity of roles and responsibilities	Poor staffing/over staffing Frequent posting
	Strong and Supportive Leadership	Poor organisational structure
Team/ Relational (Meso) Factors	Having regular team meetings	Frequent changes of team members
	Clear team responsibilities	
Individual (Micro) Factors	Orientation programmes for new members	
	Personal attributes	Female physicians should be nicer
	Trust and respect Gender	
	Interpersonal relationship Taking more responsibilities by nurses Experience	Being approachable

Thematic analysis was used to interpret the large amount of information presented in the papers, as this approach allows clear identification of dominant themes and is a means of integrating qualitative and quantitative evidence (Xyrichis & Lowton 2008).

Although the review was thorough, it was not exhaustive, as some keywords and some papers may have been missed in our search strategy. This is a particular risk in relation to grey literature (that is, studies published in non-peer-reviewed journals).

The review identified the important issues that should be considered when implementing IPC among NGPs and what should be included when planning collaborative programmes for this group of professionals. This may not be very different from what applies to other professionals, although some elements are specific to NGPs.

2.5 Summary

This chapter identified the conceptual framework used in this research and evaluated the literature in relation to the two research questions. The purpose of the first literature review was to identify the best tool for use in quantitative research. JSAPNC was selected based on the strength of its psychometric properties for use among physicians in comparison to the other tools cited. The second review identified facilitators of and barriers to IPC categorised as organisational/ structural factors, team/ relational factors and individual factors.

3.1 Introduction

This chapter explains the research design and methodology used in this research to assess the attitudes of newly graduated physicians (NGPs) in Oman towards interprofessional collaboration (IPC) and identify the factors that may hinder or promote collaboration among healthcare professionals in Oman. The study adopted a mixed methods design that collected both quantitative and qualitative data in two phases. This research can be considered as exploratory, rather than confirmatory, in view of the very limited number of previous studies conducted in Oman.

3.2 Research Design

This study adopted a mixed methods research design to assess the attitudes of NGPs who are moving forward in their career towards IPC. A mixed methods study is one that integrates both qualitative and quantitative data. This research design helps researchers to address complex issues in a comprehensive manner to a greater extent that is possible using either qualitative or quantitative methods alone (Halcomb & Hickman 2015).

This design was considered appropriate in the present context because the phenomenon under investigation—interprofessional education (IPE) and IPC—is poorly understood (Odegard & Bjorkly, 2012), mainly due to the diversity of definitions of collaboration and conceptual models in the research literature (Barr et al, 2005). Reeves et al. (2010), for instance, argued that rigorous mixed methods studies of IPE are needed in order to enhance our understanding of the

concept and its implications for patient care. Similarly, Odegard and Bjorkly (2012) recommended the use of mixed methods research to enrich the available evidence base.

The study was conducted in two stages. In the first stage, quantitative data on the attitudes of NGPs in Oman towards IPC were collected via a questionnaire. In the second stage, the factors enabling or hindering IPC among healthcare professionals were identified through focus group discussions.

3.3 Study 1: Attitudes of NGPs towards collaboration

It was considered important to first assess the attitudes of NGPs towards IPC as studies have shown that the attitudes held by one group of professionals influence the way they behave towards other professionals (Mackay 2004; Park et al. 2013). There is some evidence that positive attitudes towards collaboration are related to gender, as well as to experience (Karagiannis et al. 2012; ElSayed & Sleem 2011; Sterchi 2007). Existing literature also advocates for collaborative learning for all healthcare students as a means of promoting collaborative practice (Hojat et al. 2001; Yildirim et al. 2005). Other studies, however, report no correlation between gender (Hojat et al. 2001) or experience (Elsous et al. 2017; Onishi, Komi & Kanda. 2013) and attitudes towards collaboration. In this study, the attitudes of NGPs were assessed in relation to sociodemographic characteristics (gender and marital status) and professional characteristics (experience, prior knowledge of collaboration, graduating school and career plan).

3.3.1 Study design and population characteristics

A cross-sectional study design was employed. Cross-sectional studies are considered the most appropriate way to obtain information on a specific population (Lapkin et al. 2012). The study was conducted between December 2017 and June 2018. Participants were NGPs seeking specialist qualifications through the Oman Medical Specialty Board's (OMSB) residency training programmes. The only inclusion criterion was being a trainee in any year of an OMSB residency programme (i.e. from 1st year residency to a maximum six years for certain specialties). The decision to define 'junior' doctors as those with a maximum of 6 years of working experience was based on previous research (Milne et al. 2015).

3.3.2 Ethical considerations

Written informed consent was obtained from participants before any data were collected (Appendix 4). It was made clear to participants that they were free to refuse to participate or to withdraw at any time without disadvantage or prejudice. Both study tools were fully explained to them. Confidentiality and privacy were ensured by assigning a code to each participant. They were informed about how their information would be used.

Ethical approval for the study was obtained from the Centre of Studies and Research, Directorate General of Planning and Studies at the Ministry of Health on 8 July 2017 and from the Oman Medical Specialty Board (OMSB) in Muscat, Oman (Moh/DGPS/CSR/Proposal approved/7/2017, REC/10/2017) (Appendix 2 and 3, respectively).

3.3.3 Selection of participants

The sample size was estimated using the EPI Info version 6.0 computer program. The sample size (n) was calculated using the formula to estimate a single population proportion: $n = \frac{z^2 p (1-p)}{d^2}$

$p) / d^2]$; where, n =required sample size, z =critical value for normal distribution at 95% confidence level, P =proportion of persons with favourable attitudes towards nurse-physician collaboration, and d =margin of error 5%. Accordingly, it was estimated that $n=278$ participants were required for the study to detect a 50% difference at a power level equal to 95% confidence interval. Participants were selected using convenience sampling.

Data were collected using a self-report online questionnaire distributed by the research team. Based on lists of residents obtained from OMSB, a convenient sample of $n=278$ residents who fulfilled the inclusion criteria was selected and approached to participate. Of these, $n=257$ (92%) consented to participate in this study. The questionnaires were distributed by email together with a Participant Information Statement (Appendix 4). A total of 10 questionnaires were excluded from data analysis due to incomplete responses. Thus, responses from $n=247$ participants (88% of eligible participants) were included in the data analysis.

3.3.4 Study tools

Two instruments were used in this study: a researcher-developed sociodemographic and professional scale, and the Jefferson Scale of Attitudes towards Physicians-Nurse Collaboration (JSAPNC). The sociodemographic characteristics measured were gender and marital status, and the professional characteristics were year of graduation, graduating university, prior knowledge of IPC, employment location and career plans. The scale was in English; no translation was required.

As shown in Table 4.1, the JSAPNC comprises 15 items with responses measured on a 4-point Likert-type scale from 1 (“strongly disagree”) to 4 (“strongly agree”). The attitudes towards collaboration are shown by the total score (ranging from 15 to 60). The higher the score, the more positive is the attitude towards collaboration.

Within the scale, attitudes towards collaboration are assessed in relation to four main categories: shared education and teamwork (ETW) (7 items), caring versus curing (CC) (3 items), nurses' autonomy (NA) (3 items) and physicians' dominance (PD) (2 items). A higher factor score on shared education and teamwork indicates a greater orientation towards collaborative learning and training. A higher factor score on caring as opposed to curing indicates a more positive view of nurses' contributions to both psychological and educational aspects of care. A higher factor score on nurses' autonomy indicates more agreement with nurses' involvement in decision making regarding patient care and hospital policies. A lower factor score on physicians' dominance indicates a rejection of the dominant role of physicians in patient care. The scores for physicians' dominance are reversed. This is shown in Table 3.1.

Table 3.1 Questions in JSAPNC, Stratified and Coded by Factor Scores

Factor score	Code	Questions
Education & Teamwork	ETW1	Physicians should be educated to establish collaborative relationships with other professionals.
	ETW2	Inter-professional relationships between physicians and nurses should be included in their educational programmes.
	ETW3	Physicians and nurses should contribute to decisions regarding the hospital discharge of patients.
	ETW4	There are many overlapping areas of responsibility between physicians and nurses.
	ETW5	During their education, medical and nursing students should be involved in teamwork in order to understand their respective roles.
	ETW6	A nurse should be viewed as a collaborator and colleague with a physician rather than his/her assistant.
	ETW7	Nurses should have responsibility for monitoring the effects of medical treatment.
Caring vs. Curing	CC1	Nurses have special expertise in patient education and psychological counseling.
	CC2	Nurses should be involved in making policy decisions concerning the hospital support services upon which their work depends.
	CC3	Nurses are qualified to assess and respond to psychological aspects of patients' needs.
Nurse Autonomy	NA1	Nurses should clarify a physician's order when they feel that it might have the potential for detrimental effects on the patient.
	NA2	Nurses should be involved in making policy decisions affecting their working conditions.
	NA 3	Nurses should be accountable to patients for the nursing care they provide.
Physician Dominance	PD1	The primary function of nurses is to carry out physician's order.
	PD2	Doctors should be the dominant authority in all health care matters.

3.3.5 Quality of data

The quality of data was assessed by comparing the information obtained using the online questionnaire to that obtained from face-to-face interviews with a selected subset of participants.

3.3.6 Pilot study

Prior to data collection, a pilot study of n=25 participants was undertaken to evaluate the strengths and weaknesses of the questionnaire. This was conducted face-to-face to evaluate the researcher developed-scale, as the JSAPNC is a reliable and validated scale. The data from the pilot study were excluded from the final analysis. The pilot assessed the time taken by the respondents to complete the questionnaire (8-12 minutes) and the level of understanding of the English-language questionnaire. Overall agreement between the raters on the selected parameters (test-retest reliability) was 87% (kappa= 0.82). Global psychometric assessment of the study tools indicated that the overall reliability and validity were both high. This was done to check the researcher-developed sociodemographic and professional scale.

3.3.7 Data analysis

Data analysis was conducted in two phases. First, the JSAPNC was analysed as a continuous variable. Therefore, means and standard deviations were calculated as measures of centrality and dispersion.

Differences among various proportions of categorical data were evaluated for statistical significance using Chi-square analyses. Fisher's exact test (two-tailed) was used for a small sample size where the expected frequency was less than 5 in any of the cells in 2 x 2 tables.

In order to evaluate the significant differences between the mean values of two continuous variables, we used an unpaired student's t-test. A non-parametric test (Mann-Whitney) was used to ascertain significant differences when the assumption of normality was violated. Continuous variables were represented as mean and standard deviation (SD).

For all statistical tests, a p value ≤ 0.05 was considered statistically significant. All statistical analyses were performed using the Statistical Package for Social Sciences (SPSS) software (Version 24.0, IBM, Chicago, Illinois, USA). Linear regression analysis was conducted to confirm how the sociodemographic and professional characteristics influenced different factors.

In the second phase, the JSAPNC was analysed as a dichotomous variable (favourable IPC vs. unfavourable IPC). As described by Amsalu et al. (2014), the responses were dichotomised into favourable and unfavourable IPC responses as per the correct response predicted for each question, in order to allow for categorical data analysis. This was done to quantify the probability of a specific group based on the characteristics of the sample group and was performed using Directed Acyclic Graphs (DAGs), as elaborated below.

3.3.8 Directed Acyclic Graphs (DAGs)

Directed Acyclic Graphs (DAGs) were used to evaluate the relative predictive importance of the sociodemographic and professional characteristics in relation to the attitudes towards IPC. DAGs are a novel approach to differentiating between variables that require adjustment (i.e. confounders) and other variables, the adjustment of which would distort the measures of association (i.e. causal intermediates and common effects of both exposure and outcome, also called colliders) (McNamee 2003). Adjusting for an intermediate cofactor would attenuate the effect of the exposure on the outcome, and adjusting for a collider would create a spurious association between the exposure and the outcome, which resembles the effect of introducing selection bias to the study (Rothman & Greenland 1998).

Literature was surveyed for cofactors that are commonly adjusted for when addressing inter-professional collaboration (IPC) between physicians and nurses. The list included ethnicity,

culture, age, gender, sociodemographics, quality of healthcare, years of experience, school of graduation, medical and nursing curriculum, and professional specialty.

Some of these variables were controlled by the design of our study. For example, our study participants were homogenous in terms of ethnicity, culture, and quality of care. It was impossible to include all other variables that were not controlled for by the design. Therefore, several strategies were adopted in order to specify the most important factors and their impact on the IPC.

Prior knowledge about the subject matter was used to propose various hypothetical causal networks linking IPC and cofactors of interest. Afterwards, directed acyclic graphs (DAGs) were used to represent those networks (Rothman & Greensland 1998). As an illustration of the DAGs methodology, Figure 3.1 depicts different DAGs of the relation between IPC, gender and the cofactor. With DAGs, it was found that we needed to adjust only for school of graduation, as this was a common associated factor of both gender and IPC. Therefore, graduation school was a common cause of both gender and IPC (see DAG-1 in Figure 3.1)

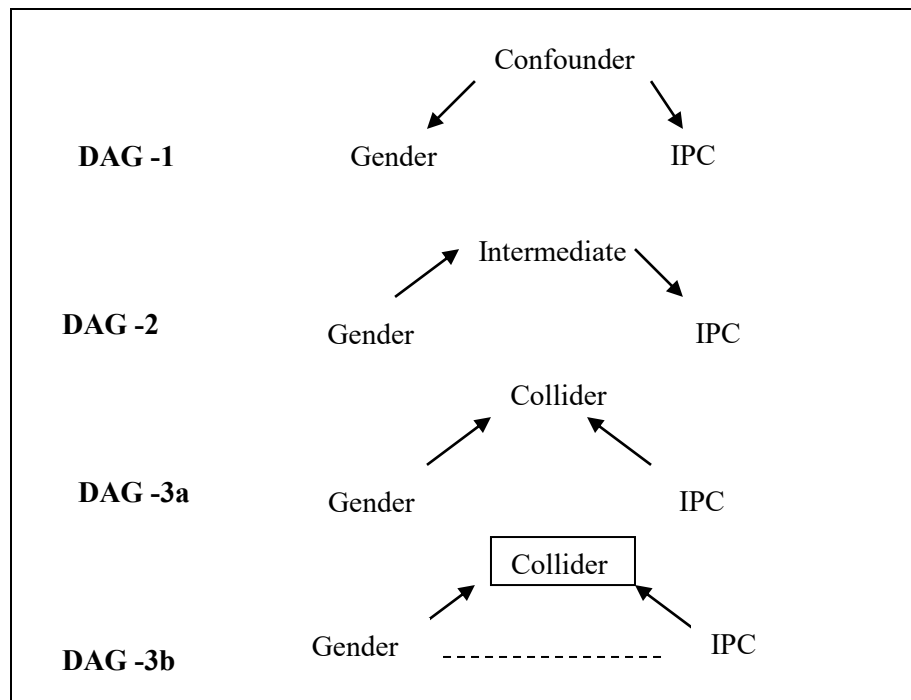


Figure 3.1 Different DAGs of the relation between gender, IPC and the cofactors. DAG-1 and DAG-2, respectively, illustrate the relation for a confounder and an intermediate. DAG-3a and DAG-3b illustrates the relation before and after adjustment for a collider.

DAGs also showed that some commonly adjusted-for variables in the literature, such as place of employment, marital status, career plan, and prior IPC knowledge may not have been confounders. Rather, they were more likely to be either intermediates or effect modifiers of the potential causal pathway between gender and IPC (see DAG -2 in Figure 3.1).

In modern epidemiology DAGs is used to help researchers make decisions about the optimal analytic strategy for a given research question. It is an accessible tool that can be applied to a variety of research questions. It also helps to identify any potential sources of bias that may lead to inaccurate conclusions (Rothman & Greensland 2008; Austin et al. 2019). However, like any mathematical model, DAGs has its limitations. According to Austin et al. (2019), one of these limitations is that, as a non-parametric method, it does not provide information regarding the

strength of the hypothesised relationships. Another limitation is that, although DAGs can identify bias, it cannot calculate the magnitude of the bias or eliminate measurement errors (Glymour 2006; Austin et al. 2019).

Despite these limitations DAGs was used in this research in order to accurately identify the factors that may influence the attitudes of NGPs towards IPC without the risk of bias in relation to the selected sociodemographic and professional characteristics.

3.4 Study 2: Perspectives of Omani Health Professionals on Factors Influencing Collaboration

In this part of the study, we explored the views among healthcare professionals in Oman towards IPC. This qualitative study provided useful supplementary information about issues that emerged during analysis of the survey data. The study had two main aims: to explore the definitions and experiences of professionals towards IPC, and to investigate the key factors that professionals perceive as important in allowing them to collaborate with other professionals. The findings have the potential to inform the development of interventions that support IPC and education in Oman since, to the best of our knowledge, no previous study in Oman or in the GCC region has addressed providers' perceptions towards IPC.

3.4.1 Study design and conceptual framework

This qualitative study was conducted in a primary care setting in Oman. Data were collected from focus group discussions (FGDs) of different healthcare professionals (doctors, nurses and paramedics) as well as healthcare managers, policy makers and academics. The purpose of the study was to identify participants' perceptions of collaboration and their views of what made

collaboration work well or not. Participants were asked to reflect on their own experiences of situations in which collaboration worked well and when it was less than optimal.

The approach followed in this study was guided by an ecological model of health behaviour (Sallis et al. 2006), since such frameworks allow for comprehensive understanding of the multiple and interacting determinants of health behaviours. Focus group discussions were chosen over in-depth interviews because it was felt that the dynamic group interactions would provide more detailed insights within group disciplines (Braun & Clarke, 2013).

This qualitative research is based on the method of interpretative phenomenological analysis (IPA), which is usually used to understand in detail the perceptions of a group on a particular topic using purposeful sampling (Smith 2004; Bradbury-Jones et al. 2017). In the present context, the aim was to provide insight into how professionals make sense of a given phenomenon, namely, IPC. Hence we wanted to examine participants' perceptions and descriptions of a particular human experience more closely.

3.4.2 Ethical considerations

Ethical approval of the work was obtained from the Ministry of Health and Oman Medical Specialty Board Research Ethics Committee (Moh/DGPS/CSR/Proposal approved/7/2017, REC/10/2017) and was carried out in accordance with the Code of Ethics of the World Medical Association (Declaration of Helsinki) for research with humans (Appendix 2&3). Written informed consent was obtained from participants, who were informed that they were free to refuse to participate or withdraw from the study at any time without any disadvantage or prejudice.

3.4.3 Selection of participants

Participants were recruited because they were healthcare professionals currently involved in the delivery of healthcare services and/or healthcare education in Muscat, the capital of Oman. To ensure sufficient diversity of opinion, professionals from multiple disciplines (consultants, medical officers, nurses, health educators and health managers) were recruited (participants of the same discipline in some groups and mixed in others).

The aim was to recruit between four and eight participants per focus group (Patton 1990). Participants were invited by written request to the director general from the primary investigator. The invitation letter (Appendix 5) was addressed to the potential participants to inform them about the date and venue of the FGDs and invite them to take part in the discussions. In this study, purposive sampling was used to identify potential participants.

To avoid selection bias and ensure a diverse range of views, participants were sought from across the institutes in the Muscat region. Hence, there were physicians from hospital and health centres, academics from the nursing institutes and managers and academics from SQU and OMSB.

An information sheet describing the study (see Appendix 5) was shared with the participants as part of their invitation letters. Although Arabic was the mother tongue for all participants, all interviews were conducted in English, since it is the common working language in the health sector in Oman.

3.4.4 Topic guide

To ensure that the process of data collection was consistent, an interview guide was prepared, but opportunities to explore responses were provided. This semi-structured interview guide was developed following the systematic review and a series of brainstorming meetings with supervisors at Imperial College, London and Sultan Qaboos University, Oman. Several techniques were adopted to ensure flow and consistency during the FGDs. For example, the questions were sequenced to move from the general to the particular, and props were used to ensure continuity of discussions (Patton 1990).

During the focus group discussions participants were asked to describe: their current work and situation in relation to participation in interprofessional teams; their perception of collaboration; and the factors that support or hinder collaboration. The topic guide (Table 3.2) was piloted and reviewed by the research team and a mixed group of professionals. Changes were made to ensure the flow of the discussion.

Table 3.2 *Interview Topic Guide*

Questions	
Opening	How do you perceive collaboration?
Introductory	What is your opinion about collaboration between doctors and nurses?
Transition	Can you give us an example of collaboration?
Key	What is your perception of the meaning of IPC? Explore the factors that would facilitate collaboration among healthcare workers. Explore the factors that would inhibit collaboration among healthcare workers.
Ending	Is there anything else you would like to add?

3.4.5 Procedure

Six FGDs were conducted in a primary health care facility from May-June 2018. All discussions were recorded and transcribed. The groups were seated in a semi-circular arrangement to facilitate communication among participants and researchers. Written and verbal informed consent was obtained from all participants. The discussions lasted 45-60 minutes and were led by HA (main researcher) and YF (assistant researcher). The group discussion was facilitated by the researcher, and the assistant was responsible for obtaining consent, distributing sheets, managing time and ensuring the researcher followed the topic guide.

At the beginning of each session, the researcher introduced herself and talked briefly about the topic. This was followed by the group introducing themselves. Permission to audio-record the discussion was sought, and the participants were asked to sign the consent form prior to starting the discussion. As well as ensuring each domain in the guide was covered, the research assistant took notes of the main issues that emerged.

All interviews were audio-recorded and subsequently transcribed. Discussions continued until saturation of the data was achieved.

3.4.6 Data analysis

Data obtained from the audiotapes were transcribed and independently coded by two facilitators (HA and YF) using Nvivo 12. Each facilitator read the transcripts several times and then applied initial open coding and grouping based on recurring themes. Themes emerged through constant comparison. These initial analyses were then reviewed by a third investigator (TG) to confirm themes and subthemes. The results were then discussed by all investigators until consensus was reached on the main themes (Braun & Clarke, 2013). The third investigator was contacted for

further measure of reliability for the study. An interpretive phenomenological qualitative analysis was conducted to get to the theme.

Although no new themes appeared to be emerging after the fourth FGC, two additional group discussions were conducted to ensure that saturation had been achieved.

To enhance our reliability and ensure the accuracy of the data transcribed the first two discussions were transcribed and given to the participants to review for accuracy.

3.4.7 Availability of data and materials

Omani data protection laws prohibit sharing of these data, which cannot be deposited in publicly accessible archives. Transcripts of the focus group discussions are available on request and with approval from the Oman Ministry of Health.

3.5 Summary

This chapter explained the research design and methods used in this study. A mixed method design was adopted to collect both quantitative and qualitative data on the phenomenon under investigation. The following chapter presents the results for the quantitative phase of the study.

CHAPTER 4: RESULTS OF ANALYSIS OF JSAPNC SCALE

4.1 Sociodemographic and Professional Characteristics of Participants

A total of 247 newly graduated physicians (NGPs) participated in the study, of whom 161 (65.2%) were female and 86 (34.8%) were male. Table 4.1 shows selected socio-demographic and professional characteristics of participants. The majority of the participants were female, married and graduates of the national university. They were also mostly junior physicians who attended tertiary care institutes, with career plans in medical specialties, and who reported no prior knowledge of IPC. Between groups, more married participants were reported among males (80% vs. 59%; respectively). Compared to females, higher proportions of national university graduates were males (57.1% vs. 87.2%).

The distributions of employment location, clinical experience, and career plans were comparable among the female and male groups. A higher proportion of male physicians (54.7%) reported prior IPC knowledge compared to females (42.9%).

Table 4.1 *Selected Sociodemographic and Professional Characteristics of NGPs, Oman, 2018.*

Characteristic	Total (N= 247)	Female (N= 161)	Male (N= 86)
	N (%)	N (%)	N (%)
Marital status			
Ever married	164 (66.4)	95 (59.0)	69 (80.2)
Never married	83 (33.6)	66 (41.0)	17 (19.8)
Graduation School			
National University	167 (67.6)	92 (57.1)	75 (87.2)
Others	80 (32.4)	69 (42.9)	11 (12.8)
Employment location			
Primary Care	36 (14.6)	27 (16.8)	9 (10.5)
Tertiary Care	211 (85.4)	134 (83.2)	77 (89.5)
Clinical Experience			
Junior (1,2&3)	214 (86.6)	138 (85.7)	76 (88.4)
Senior (4,5&6)	33 (13.4)	23 (14.2)	10 (11.6)
Career Plans			
Medical	167 (67.6)	112 (69.6)	55 (64.0)
Surgical	80 (32.4)	49 (30.4)	31 (36.0)
ICP Knowledge[±]			
Yes	116 (47.0)	69 (42.9)	47 (54.7)
No	131 (53.0)	92 (57.1)	39 (45.3)

[±] *Previous exposure to inter-professional collaboration (ICP)*

4.2 Analysis of Global JSAPNC scale as a continuous variable

Table 4.2 shows the descriptive statistics of JSAPNC as a continuous variable among study participants. Overall, the total JSAPNC mean score among NGPs was 48.0, and the median was 47. The means for the JSAPNC factor scores were: education and teamwork (23.3), caring versus curing (9.7), nurse autonomy (10.1) and physician dominance (5.0).

Table 4.2 *Descriptive Statistics of the JSAPNC for Global and Factor Scores, Oman, 2018*

	Mean (SD)	Median (IQR)	Minimum	Maximum
Global (N= 247)	47.97 (4.3)	47 (6)	39.00	60.00
Education & teamwork	23.26 (2.35)	23 (4.0)	18.0	28.00
Caring vs curing	9.68 (1.16)	9 (1)	7.0	12.00
Nurse autonomy	10.05 (1.19)	10 (2)	6.0	12.00
Physician dominance	4.98 (1.23)	5 (2)	2.00	8.00

4.2.1 Means of JSAPNC factor scores indices

Table 4.3 shows the means and standard deviations of JSAPNC global and factor scores over the selected sociodemographic and professional characteristics of participants. The mean global score was significantly higher among males compared to females (48.8 vs. 47.6; $p= 0.03$); and among those with prior IPC knowledge compared to those without (48.9 vs. 47.2; $p= 0.001$).

A similar pattern was also observed with gender among other factor scores except physician dominance, where males had a lower mean factor score compared to females (4.93 vs. 5.01). Nonetheless, the difference was not statistically significant ($p= 0.62$). Similarly, with IPC knowledge, all factors score had a higher mean among those with prior IPC knowledge except physician dominance, which was lower and statistically significant (4.78 vs. 5.16; $p= 0.02$).

Table 4.3 *Indices of JSAPNC Global and Factor Scores (Mean, SD) by Selected Sociodemographic and Professional Characteristics, Oman, 2018*

Characteristic	JSAPNC Score				
	Global Mean (SD)	ETW Mean (SD)	CC Mean (SD)	NA Mean (SD)	PD Mean (SD)
Overall	47.97 (4.2)	23.3 (2.4)	9.7 (1.2)	10.1 (1.2)	5.0 (1.2)
Gender					
Female	47.55 (4.01)	23.03 (2.21)	9.56 (1.06)	9.94 (1.56)	5.01 (1.17)
Male	48.77 (4.63)	23.69 (2.55)	9.90 (1.30)	10.26 (1.22)	4.93 (1.35)
<i>p</i> value	0.03	0.05	0.04	0.05	0.62
Employment					
Primary	48.56 (4.52)	23.58 (2.31)	9.78 (1.07)	10.17 (1.13)	5.03 (1.11)
Tertiary	47.87 (4.23)	23.20 (2.36)	9.66 (1.17)	10.03 (1.17)	4.98 (1.26)
<i>p</i> value	0.38	0.37	0.57	0.53	0.82
Clinical Experience					
Junior	47.27 (4.73)	23.00 (2.23)	9.62 (1.14)	10.05 (1.17)	5.05 (1.15)
Senior	48.08 (4.20)	23.47(2.44)	9.72 (1.17)	10.05 (1.20)	4.93 (1.29)
<i>p</i> value	0.42	0.12	0.48	0.98	0.42
Marital Status					
Never-Married	47.52 (3.93)	22.95 (2.19)	9.51 (1.12)	10.02 (1.13)	5.04 (1.12)
Married	48.20 (4.43)	23.41 (2.42)	9.76 (1.17)	10.07 (1.22)	4.96 (1.29)
<i>p</i> value	0.22	0.13	0.10	0.78	0.64
Graduating School					
SQU	47.93 (4.24)	23.19 (2.41)	9.63 (1.16)	10.04 (1.15)	5.06 (1.20)
Non-SQU	48.05 (4.37)	23.38 (2.24)	9.76 (1.16)	10.07 (1.26)	4.83 (1.29)
<i>p</i> value	0.84	0.55	0.42	0.84	0.16
Career Plan					
Medical	48.14 (4.35)	23.34 (2.36)	9.70 (1.08)	10.12 (1.18)	4.98 (1.22)
Surgical	47.63 (4.11)	23.10 (2.35)	9.63 (1.32)	9.91 (1.19)	4.99 (1.27)
<i>p</i> value	0.38	0.46	0.66	0.20	0.97
IPC Knowledge					
Yes	48.90 (4.53)	23.87 (2.50)	9.95 (1.22)	10.30 (1.20)	4.78 (1.37)
No	47.15 (3.85)	22.71 (2.08)	9.44 (1.05)	9.83 (1.14)	5.16 (1.07)
<i>p</i> value	0.001	0.000	0.001	0.002	0.02

*Acronyms refer to JSAPNC factor scores as follows: Education & teamwork (ETW), Caring vs. curing (CC), Nurse autonomy (NA), and Physicians' dominance (PD). *p* value generated by independent student *t*-test.*

4.2.2 Correlation between global and factor scores of JSAPNC

Table 4.4 shows the correlation coefficients (r) between the global score and each of the factor scores of JSAPNC. Generally, significant strong positive correlations were obtained between the global score and the following factors: education and teamwork, caring versus curing and nurse autonomy ($r= 0.889, 0.803, \text{ and } 0.848$, respectively). The correlation between the global score and the physician dominance factor score was negative and weak ($r= -0.195$), but statistically significant. A strong and positive correlation was obtained between education and teamwork and each of caring versus curing ($r= 0.641$) and nurse autonomy ($r= 0.717$), and these were statistically significant. Also, a strong and positive correlation was obtained between caring vs. curing and nurse autonomy factor scores ($r= 0.696$), and it was significant. Nonetheless, the correlations between physician dominance factor score and other factor scores were all weak and negative ($r= -0.122, -0.049, -0.047$) and non-significant ($p>0.05$).

Table 4.4 *Inter-item Correlation Matrix between Total and Indices of Factor Scores of JSAPNC, Oman, 2018*

	Global	ETW	CC	NA	PD
Global	1.000	-	-	-	-
ETW	0.889**	1.000	-	-	-
CC	0.803**	0.641**	1.000	-	-
NA	0.848**	0.717**	0.696**	1.000	-
PD	-0.195**	-0.122	-.049	-.047	1.000

Acronyms refer to JSAPNC factor scores as follows: Education & teamwork (ETW), Caring vs. curing (CC), Nurse autonomy (NA), and Physicians' dominance (PD).

4.3 Association between global JSAPNC score and selected sociodemographic and professional characteristics of participants

Table 4.5 shows the association between IPC as measured by the total JSAPNC score and selected sociodemographic and professional characteristics of participants. Gender and prior knowledge of IPC were found to be the major significant predictors of IPC after adjusting for other factors ($\beta = 0.134$ & $\beta = 0.194$ respectively, $p < 0.05$). Marital status, graduating school, employment location, clinical experience and career plan were found to be non-significant predictors of IPC ($p > 0.05$). Figure 4.2 depicts the pattern of associations between JSAPNC and the selected sociodemographic and professional characteristics.

Table 4.5 *Association between Global JSAPNC Score and Selected Sociodemographic and Professional Characteristics of Participants, Oman, 2018*

Predictor	Regression parameters		
	Standardised β	Standard error (SE)	p -value
Female gender	0.134	0.599	0.047*
Single marital status	0.035	0.596	0.593
Non-SQU graduation school	0.063	0.616	0.355
Tertiary employment location	-0.060	0.794	0.363
Junior clinical experience	0.012	0.550	0.851
Surgical career plan	0.035	0.595	0.355
Prior IPC knowledge- Yes [±]	-0.194	0.548	0.003*

[±]Previous exposure to inter-professional collaboration (IPC).

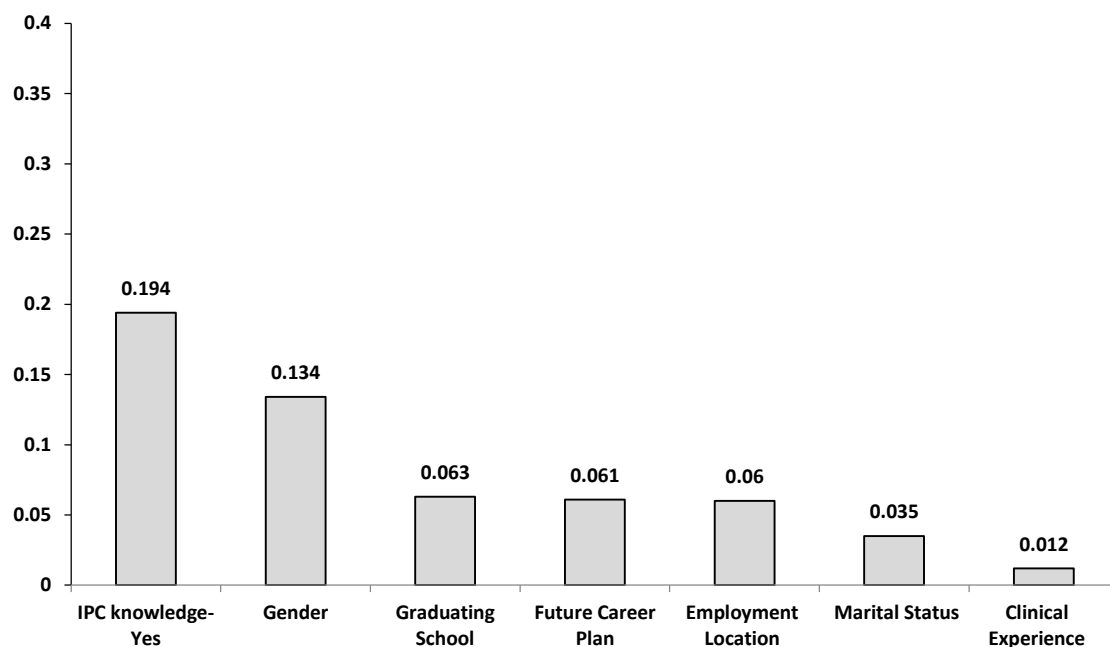


Figure 4.1 Association between Global JSAPNC score and sociodemographic and professional characteristics of participants, Oman, 2018.

4.4 Analysis of Global JSAPNC Scale as a Categorical Variable

Table 4.6 shows a comparison between high-IPC and low-IPC groups of Global JSAPNC over selected sociodemographic and professional characteristics of participants. Of the total of 247 participants, 136 (55%) were labelled as high-IPC and 111 (45%) as low-IPC. Compared to the low-IPC group, participants with high-IPC were more likely to be married males who graduated from non-SQU medical school, with primary care employment, with senior clinical experience, and with a medical career plan. Interestingly, participants with high-IPC were more likely to have prior IPC knowledge compared to the low-IPC group.

Table 4.6 *Comparative Assessment of High and Low IPC Groups over Global JSAPNC Scale, Oman, 2018*

Characteristic	High Global IPC	Low Global IPC
	(≥ 47)	(<47)
	(N= 136)	(N= 111)
	N (%)	N (%)
Gender		
Female	83 (61.0)	78 (70.3)
Male	53 (39.0)	33 (29.7)
Employment		
Tertiary	114 (83.8)	97 (87.4)
Primary	22 (16.2)	14 (12.6)
Clinical Experience		
Junior	57 (41.9)	53 (47.7)
Senior	79 (58.1)	58 (52.3)
Marital Status		
Never-married	42 (30.9)	41 (36.9)
Married	94 (69.1)	70 (63.1)
Graduation school		
Non-SQU	47 (34.6)	33 (29.7)
SQU	89 (65.4)	78 (70.3)
Career Plan		
Surgical	42 (30.9)	38 (34.2)
Medical	94 (69.1)	73 (65.8)
IPC knowledge		
No	63 (46.3)	68 (61.3)
Yes	73 (53.7)	43 (38.7)

Table 4.7 shows the crude and adjusted OR using directed acyclic graphs (DAGs). In this analysis, place of graduation was negatively associated with increased IPC but it was statistically not significant, whereas it was positively associated with IPC prior knowledge and strongly significant.

Table 4.7 *Assessment using DAGs for Global JSAPNC Scale, Oman, 2018*

Characteristic	Crude OR	Adjusted OR (95% CI)	P value
Gender	1.51	1.70 (0.97, 2.98)	0.065
Employment	1.33	1.33 (0.65, 2.75)	0.434
Clinical Experience	1.27	1.31 (0.79, 2.19)	0.295
Marital Status	1.31	1.42 (0.82, 2.47)	0.210
Graduation	0.80	0.80 (0.47, 1.37)	0.420
Career Plan	1.16	1.17 (0.68, 1.99)	0.574
IPC Knowledge	1.83	1.83 (1.10, 3.05)	0.020

Figure 4.3 shows the order of strength of associations as per the adjusted DAGs-based model. Being a graduate from SQU was the only factor that was negatively associated with increased IPC (OR 0.80; 95% CI 0.47, 1.37).

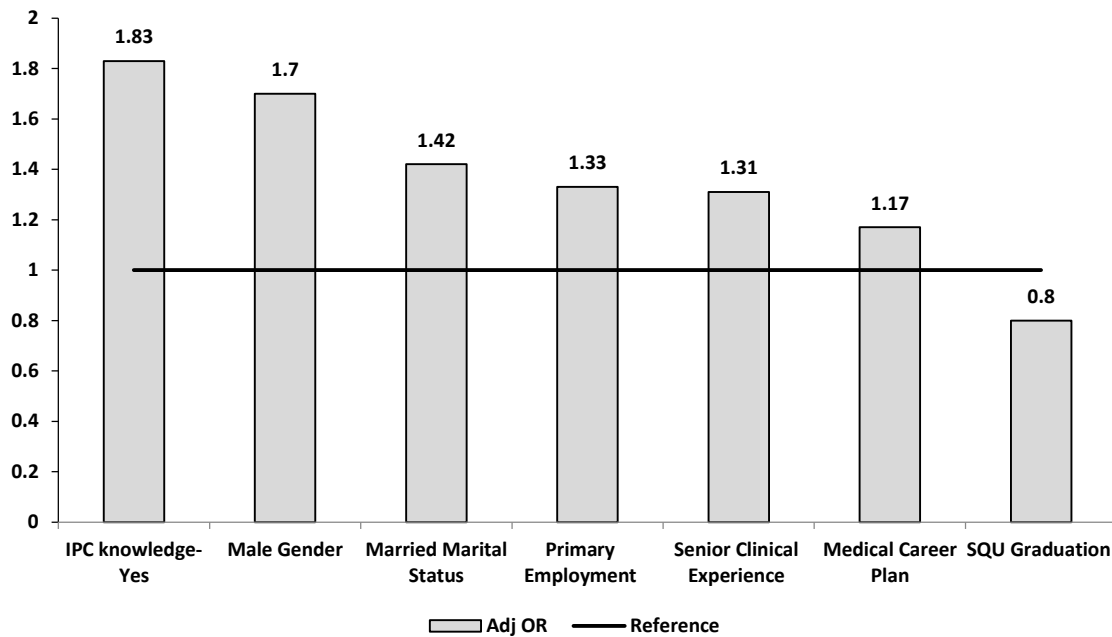


Figure 4.2 Association of sociodemographic and professional characteristics with Global JSAPNC Scale, Oman, 2018.

4.5 Summary

This chapter presented the results of analysis of responses to the global JSAPNC scale as both continuous and categorical variables. The next chapter describes the analyses of the factor scale of the JSAPNC in relation to education and teamwork, caring as opposed to curing, nurse autonomy and physician dominance.

CHAPTER 5: ANALYSIS OF FACTOR SCALE OF JSAPNC

5.1 Analysis of Education & Teamwork Factor Scale as a Continuous Variable

Table 5.1 shows the association between IPC as measured by the education and teamwork (ETW) factor scale and selected sociodemographic and professional characteristics of participants. Gender and prior knowledge of IPC were found to be the major significant predictors of IPC after adjusting for other factors ($\beta = 0.129$ & $\beta = 0.223$ respectively, $p < 0.05$). Marital status, graduating school, employment location, clinical experience and career plan were found to be non-significant predictors of IPC ($p > 0.05$). Figure 5.1 depicts the pattern of associations between JSAPNC and the selected sociodemographic and professional characteristics.

Table 5.1 *Association between the ETW JSAPNC Scale and Selected Sociodemographic and Professional Characteristics of Participants, Oman, 2018*

Predictor	Regression parameters		
	Standardised β	Standard error (SE)	p -value
Female gender	0.129	0.326	0.053*
Single marital status	0.055	0.324	0.397
Non-SQU graduation School	0.098	0.335	0.144
Tertiary employment location	0.060	0.432	0.356
Junior clinical experience	0.058	0.299	0.358
Surgical career plan	0.053	0.324	0.414
Prior IPC Knowledge- Yes [±]	0.223	0.298	0.001*

[±]Previous exposure to interprofessional collaboration (IPC).

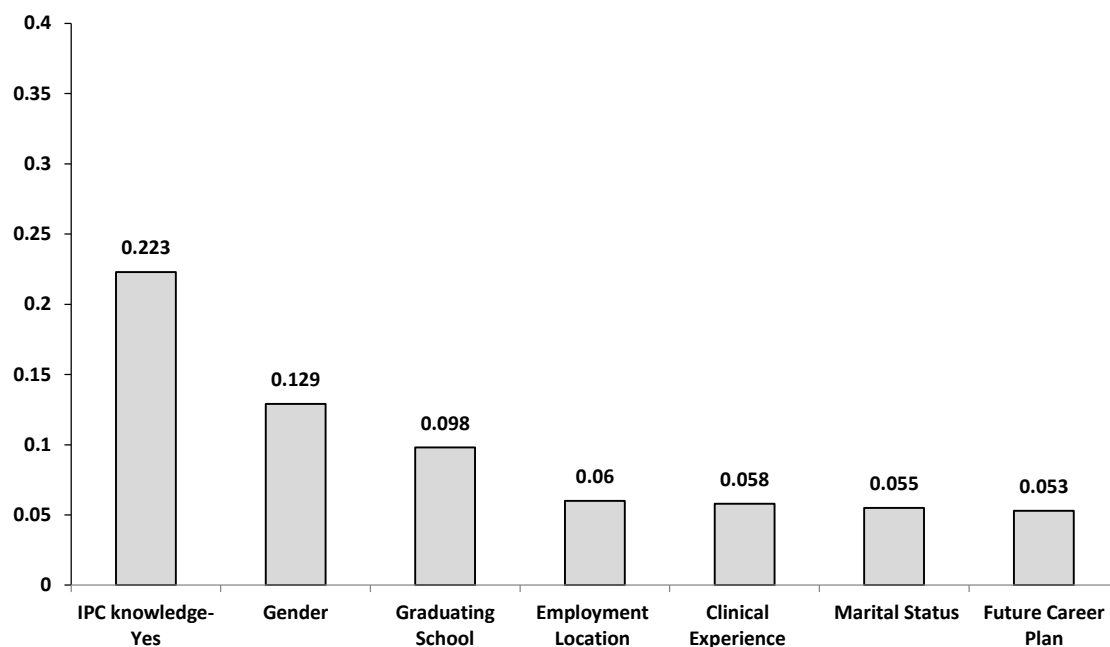


Figure 5.1 Association between the ETW JSAPNC and sociodemographic and professional characteristics of participants, Oman, 2018.

5.2 Analysis of Education & Teamwork Factor Scale as a Categorical Variable

Table 5.2 shows a comparison between high-IPC and low-IPC groups on the ETW factor scale across selected sociodemographic and professional characteristics of participants. Of the total of 247 participants, 132 (53.3%) were labelled as high-IPC on the ETW factor scale and 115 (46.7%) as low-IPC on the ETW factor scale. Compared to the low-IPC group, participants with high-IPC on the ETW factor scale were more likely to be married males who graduated from non-SQU medical school, with primary care employment, with senior clinical experience, and with a medical career plan. Interestingly, participants with high-IPC on the ETW factor scale were more likely to have prior IPC knowledge compared to the low-IPC group on the ETW factor scale.

Table 5.2 *Comparative Assessment of High and Low IPC Groups on the ETW Factor Scale, Oman, 2018*

Characteristic	High IPC on ETW (≥ 23)	Low IPC on ETW (< 23)
	(N= 132)	(N= 115)
	N (%)	N (%)
Gender		
Female	80 (60.6)	81 (70.4)
Male	52 (39.4)	34 (29.6)
Employment		
Tertiary	111 (84.1)	100 (87.0)
Primary	21 (15.9)	15 (13.0)
Clinical Experience		
Junior	56 (42.4)	54 (47.0)
Senior	76 (57.6)	61 (53.0)
Marital Status		
Never-married	41 (31.1)	42 (36.5)
Married	91 (68.9)	73 (63.5)
Graduation school		
Non-SQU	49 (37.1)	31 (27.0)
SQU	83 (62.9)	84 (73.0)
Career Plan		
Surgical	39 (29.5)	41 (35.7)
Medical	93 (70.5)	74 (64.3)
IPC knowledge		
No	59 (44.7)	72 (62.6)
Yes	73 (55.3)	43 (37.4)

Table 5.3 shows the crude and adjusted OR using directed acyclic graphs (DAGs). This analysis showed that place of graduation was negatively associated with increased IPC, but this was not statistically significant. However, it was positively associated with IPC prior knowledge, and this was statistically significant.

Table 5.3 *Assessment using DAGs for ETW Factor Scale, Oman, 2018*

Characteristic	Crude OR	Adjusted OR (95% CI)	P value
Gender	1.55	1.55 (0.91, 2.63)	0.107
Employment	1.27	1.37 (0.66, 2.86)	0.406
Clinical Experience	1.20	1.26 (0.75, 2.12)	0.381
Marital Status	1.28	1.38 (0.78, 2.42)	0.270
Graduation	0.63	0.63 (0.36, 1.08)	0.090
Career Plan	1.32	1.38 (0.81, 2.38)	0.233
IPC Knowledge	2.07	1.97 (1.17, 3.32)	0.010

Figure 5.2 shows the order of strength of associations as per the adjusted DAGs-based model. Being a graduate from SQU was the only factor that was negatively associated with increased IPC on the ETW factor scale (OR 0.63; 95% CI 0.36, 1.08).

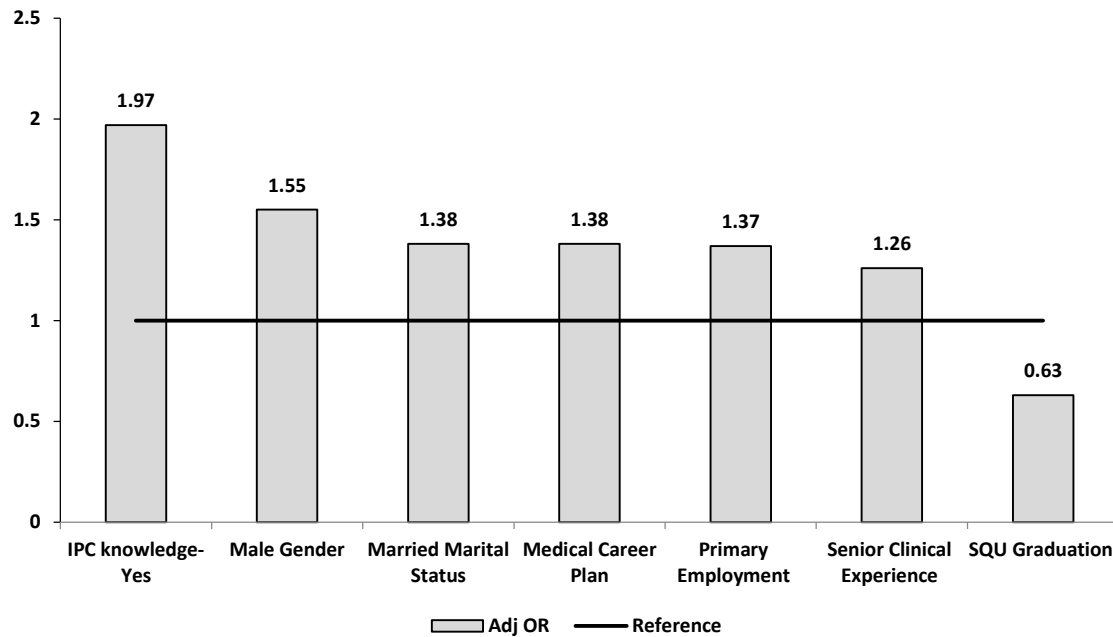


Figure 5.2 Association of sociodemographic and professional characteristics with ETW factor scale, Oman, 2018.

5.3 Analysis of Caring vs. Curing Factor Scale as a Continuous Variable

Table 5.4 shows the association between IPC as measured by the caring vs. curing (CC) factor scale and selected sociodemographic and professional characteristics of participants. Gender and prior knowledge of IPC were found to be the major significant predictors of IPC after adjusting for other factors ($\beta = 0.139$ and $\beta = 0.202$ respectively, $p < 0.05$). Marital status, graduating school, employment location, clinical experience and career plan were found to be non-significant predictors of IPC ($p > 0.05$). Figure 5.3 depicts the pattern of associations between JSAPNC and the selected sociodemographic and professional characteristics.

Table 5.4 Association between the CC JSAPNC Score and Selected Sociodemographic and Professional Characteristics of Participants, Oman, 2018

Predictor	Regression parameters		
	Standardised β	Standard error (SE)	<i>p</i> -value
Female gender	0.139	0.606	0.037*
Single marital status	0.078	0.161	0.235
Non-SQU graduation school	0.114	0.166	0.092
Tertiary employment location	0.043	0.214	0.507
Junior clinical experience	0.007	0.148	0.909
Surgical career plan	0.039	0.160	0.550
Prior IPC knowledge- Yes [±]	0.202	0.148	.002*

[±]Previous exposure to inter-professional collaboration (IPC)

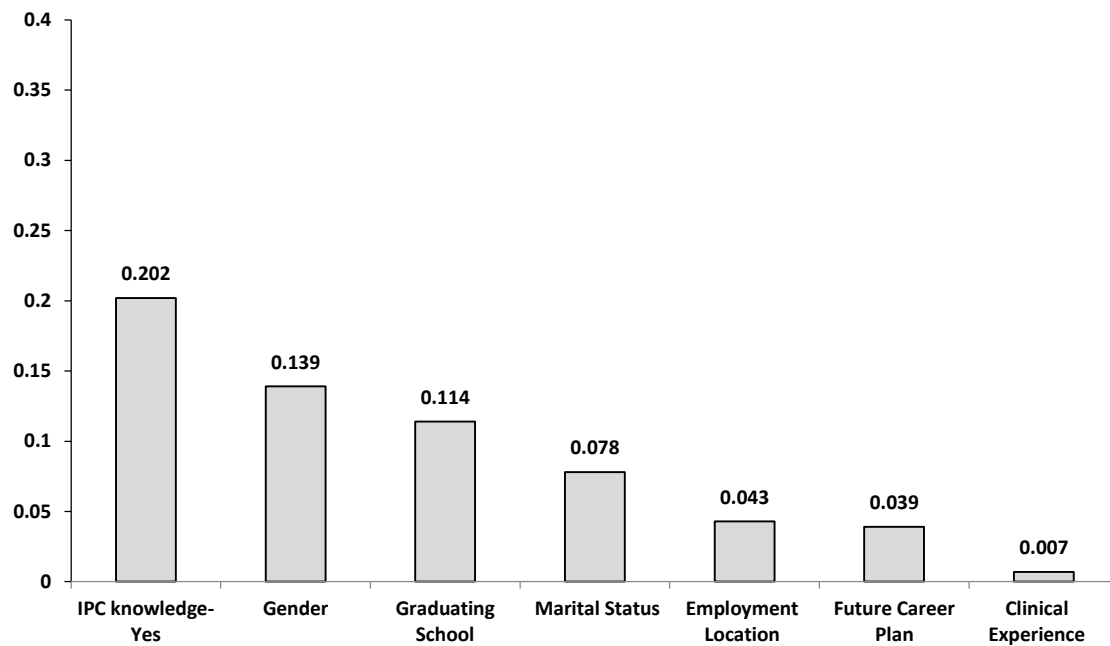


Figure 5.3 Association between the CC JSAPNC and sociodemographic and professional characteristics of participants, Oman, 2018.

5.4 Analysis of Caring vs. Curing Factor Scale as a Categorical Variable

Table 5.5 shows a comparison between high-IPC and low-IPC groups on the caring vs. curing (CC) factor scale over selected sociodemographic and professional characteristics of participants. Of the total of 247 participants, 232 (93.9%) were labelled as high-IPC on the CC factor scale, compared to only 15 participants (6.1%) with low-IPC on the CC factor scale. Compared to the low-IPC group, participants with high-IPC on the CC factor scale were more likely to be never-married females who graduated from non-SQU medical school, with tertiary care employment, with senior clinical experience, and with a surgical career plan. Participants with high-IPC on the CC factor scale were more likely to have prior IPC knowledge compared to the low-IPC group on the CC factor scale.

Table 5.5 *Comparative Assessment of High and Low IPC Groups on the CC Factor Scale, Oman, 2018*

Characteristic	High IPC over CC (≥ 9)	Low IPC over CC (< 9)
	(N= 232)	(N= 15)
	N (%)	N (%)
Gender		
Female	152 (65.5)	9 (60.0)
Male	80 (34.5)	6 (40.0)
Employment		
Tertiary	35 (15.1)	1 (6.7)
Primary	197 (84.9)	14 (93.3)
Clinical Experience		
Junior	103 (44.4)	7 (46.7)
Senior	129 (55.6)	8 (53.3)
Marital Status		
Never-married	77 (33.2)	6 (40.0)
Married	155 (66.8)	9 (60.0)
Graduation school		
Non-SQU	76 (32.8)	4 (26.7)
SQU	156 (67.2)	11 (73.3)
Career Plan		
Surgical	161 (69.4)	6 (40.0)
Medical	71 (30.6)	9 (60.0)
IPC knowledge		
No	121 (52.2)	10 (66.7)
Yes	111 (47.8)	5 (33.3)

Table 5.6 shows assessment of the predictors of Caring vs. Curing factor scale using directed acyclic graphs (DAGs). This analysis showed that prior IPC knowledge and marital status were positively associated with the caring and curing factors.

Table 5.6 *Assessment using DAGs for CC Factor Scale, Oman, 2018*

Characteristic	Crude OR	Adjusted OR (95% CI)	P value
Gender	0.79	0.77 (0.26, 2.28)	0.641
Employment	0.40	0.40 (0.05, 3.16)	0.386
Clinical Experience	1.10	0.97 (0.33, 2.81)	0.955
Marital Status	1.34	1.21 (0.41, 3.58)	0.722
Graduation	0.75	0.76 (0.23, 2.48)	0.651
Career Plan	0.29	0.30 (0.10, 0.92)	0.036
IPC Knowledge	1.84	1.84 (0.61, 5.53)	0.281

Figure 5.4 shows the order of strength of associations as per the adjusted DAGs-based model. Prior IPC knowledge and married marital status were the only factors that were positively associated with increased IPC on the CC factor scale.

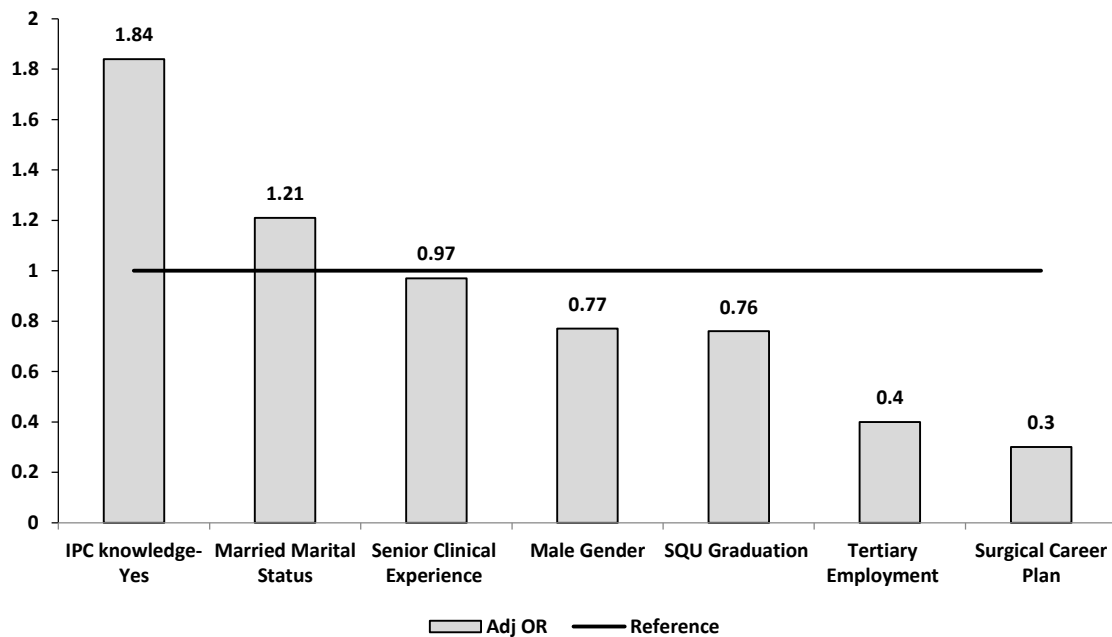


Figure 5.4 Association of sociodemographics and professional characteristics with CC factor scale, Oman, 2018.

5.5 Analysis of Nurse Autonomy Factor Scale as a Continuous Variable

Table 5.7 shows the association between IPC as measured by the education and nurse autonomy (NA) factor scale and selected sociodemographic and professional characteristics of participants. Gender and prior knowledge of IPC were found to be the major significant predictors of IPC after adjusting for other factors ($\beta = 0.133$ & $\beta = 0.201$ respectively, $p < 0.05$). Marital status, graduating school, employment location, clinical experience and career plan were found to be non-significant predictors of IPC ($p > 0.05$). Figure 5.5 depicts the pattern of associations between JSAPNC and the selected sociodemographic and professional characteristics.

Table 5.7 Association between the NA JSAPNC Score and Selected Sociodemographic and Professional Characteristics of participants, Oman, 2018

Predictor	Regression parameters		
	Standardised β	Standard error (SE)	<i>p</i> -value
Female gender	0.133	0.167	0.049*
Single marital status	-0.024	0.166	0.714
Non-SQU graduation school	0.040	0.171	0.554
Tertiary employment location	0.041	0.221	0.535
Junior clinical experience	-0.038	0.153	0.558
Surgical career plan	0.094	0.166	0.153
Prior IPC Knowledge- Yes [±]	0.201	0.152	0.002*

[±]Previous exposure to inter-professional collaboration (IPC)

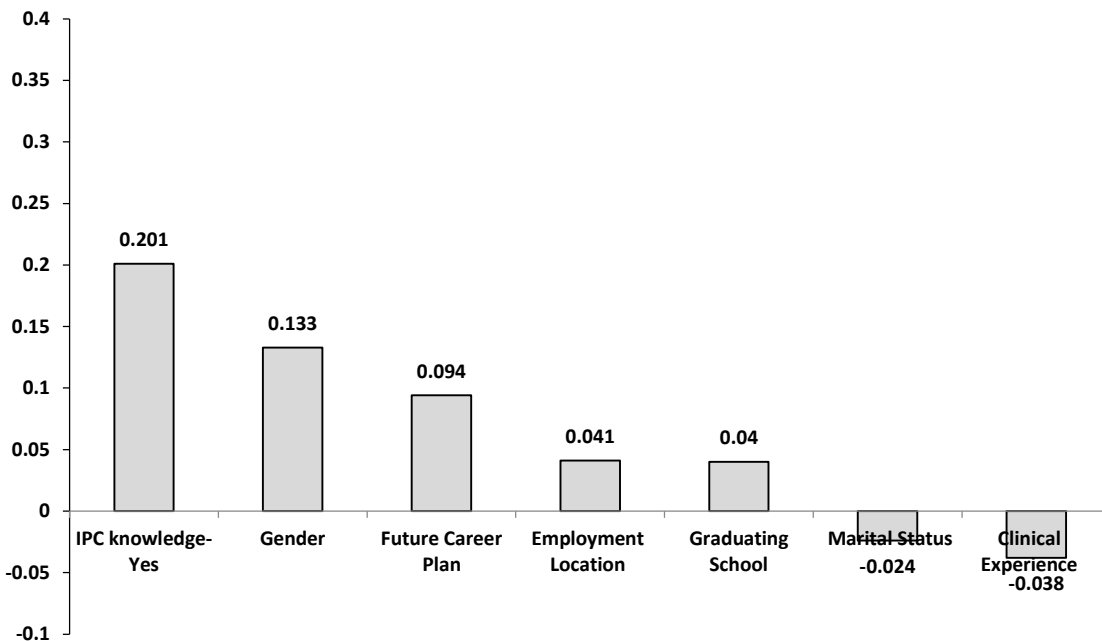


Figure 5.5 Association between the NA JSAPNC and sociodemographic and professional characteristics of participants, Oman, 2018.

5.6 Analysis of Nurse Autonomy Factor Scale as a Categorical Variable

Table 5.8 shows a comparison between high-IPC and low-IPC groups on the nurse autonomy (NA) factor scale over selected sociodemographic and professional characteristics of participants. Of the total of 247 participants, 147 (59.9%) were labelled as high-IPC on the NA factor scale, compared to 100 participants (40.5%) with low-IPC on the NA factor scale. Compared to the low-IPC group, participants with high-IPC on the NA factor scale were more likely to be never-married males who graduated from non-SQU medical school, with tertiary care employment, with senior clinical experience, and with a surgical career plan. Participants with high-IPC on the NA factor scale were more likely to have prior IPC knowledge compared to the low-IPC group on the NA factor scale.

Table 5.8 *Comparative Assessment of High and Low IPC Groups on the NA Factor Scale, Oman, 2018*

Characteristic	High IPC over NA (≥ 10)	Low IPC over NA (< 10)
	(N= 147)	(N= 100)
	N (%)	N (%)
Gender		
Female	91 (61.9)	70 (70.0)
Male	56 (38.1)	30 (30.0)
Employment		
Tertiary	23 (15.6)	13 (13.0)
Primary	124 (84.4)	87 (87.0)
Clinical Experience		
Junior	64 (43.5)	46 (46.0)
Senior	83 (56.5)	54 (54.0)
Marital Status		
Never-married	53 (36.1)	30 (30.0)
Married	94 (63.9)	70 (70.0)
Graduation school		
Non-SQU	53 (36.1)	27 (27.0)
SQU	94 (63.9)	73 (73.0)
Career Plan		
Surgical	100 (68.0)	67 (67.0)
Medical	47 (32.0)	33 (33.0)
IPC knowledge		
No	67 (45.6)	64 (64.0)
Yes	80 (54.4)	36 (36.0)

Table 5.9 shows assessment using directed acyclic graphs (DAGs) on the predictors of the Nurse Autonomy factor scale. This analysis showed that prior knowledge of IPC, gender and clinical experience were positively associated with the nurse autonomy factor, however only prior knowledge of IPC was statistically significant.

Table 5.9 *Assessment using DAGs for NA Factor Scale, Oman, 2018*

Characteristic	Crude OR	Adjusted OR (95% CI)	P value
Gender	1.44	1.44 (0.84, 2.47)	0.191
Employment	0.81	0.81 (0.39, 1.68)	0.563
Clinical Experience	1.11	0.98 (0.57, 1.67)	0.937
Marital Status	0.76	0.76 (0.44, 1.31)	0.323
Graduation	0.66	0.61 (0.33, 1.12)	0.113
Career Plan	0.95	0.92 (0.52, 1.65)	0.787
IPC Knowledge	2.10	2.10 (1.26, 3.58)	0.005

Figure 5.6 shows the order of strength of associations as per the adjusted DAGs-based model. Prior IPC knowledge and male gender were the only factors that were positively associated with increased IPC on the CC factor scale.

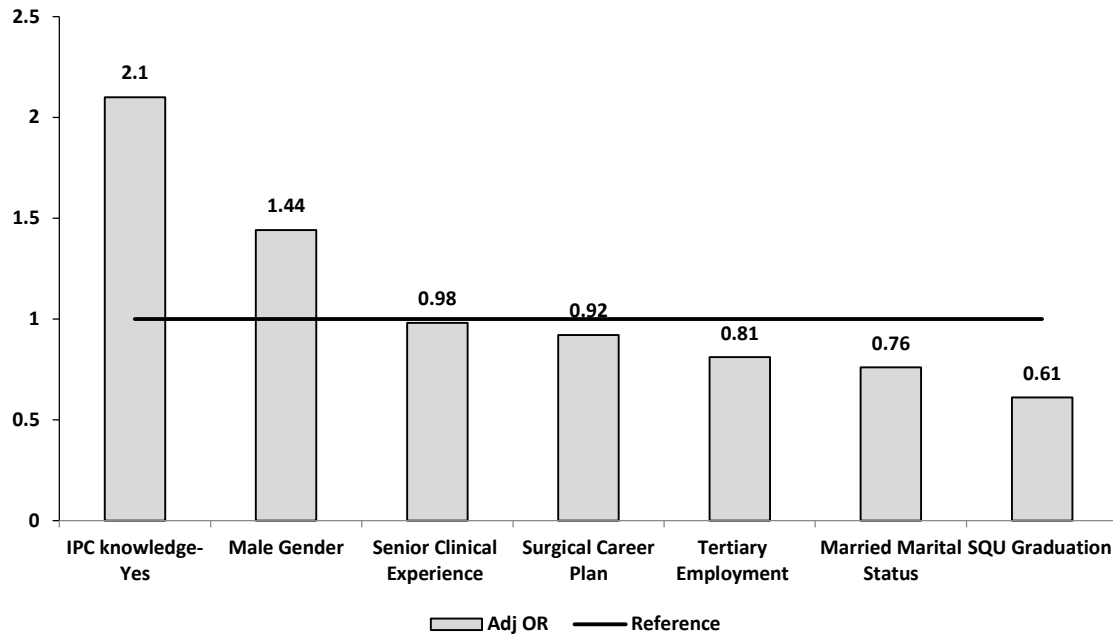


Figure 5.6 Association of sociodemographic and professional characteristics with NA factor scale, Oman, 2018.

5.7 Analysis of Physician Dominance Factor Scale as a Continuous Variable

Table 5.10 shows the association between IPC as measured by the physician dominance (PD) factor scale and selected sociodemographic and professional characteristics of participants. Prior knowledge of IPC was found to be the only significant predictor of IPC after adjusting for other factors ($\beta = 0.138$, $p < 0.05$). Gender, marital status, graduating school, employment location, clinical experience and career plan were found to be non-significant predictors of IPC ($p > 0.05$).

Figure 5.7 depicts the pattern of associations between JSAPNC and the selected sociodemographic and professional characteristics.

Table 5.10 *Association between the PD JSAPNC Scale and Selected Sociodemographic and Professional Characteristics of participants, Oman, 2018*

Predictor	Regression parameters		
	Standardised β	Standard error (SE)	<i>p</i> -value
Female gender	-0.041	0.176	0.550
Single marital status	-0.033	0.175	0.621
Non-SQU graduation school	-0.115	0.181	0.095
Tertiary employment location	0.013	0.233	0.851
Junior clinical experience	-0.040	0.162	0.538
Surgical career plan	-0.018	0.175	0.788
Prior IPC knowledge- Yes [±]	-0.138	0.161	0.036*

[±]Previous exposure to inter-professional collaboration (IPC)

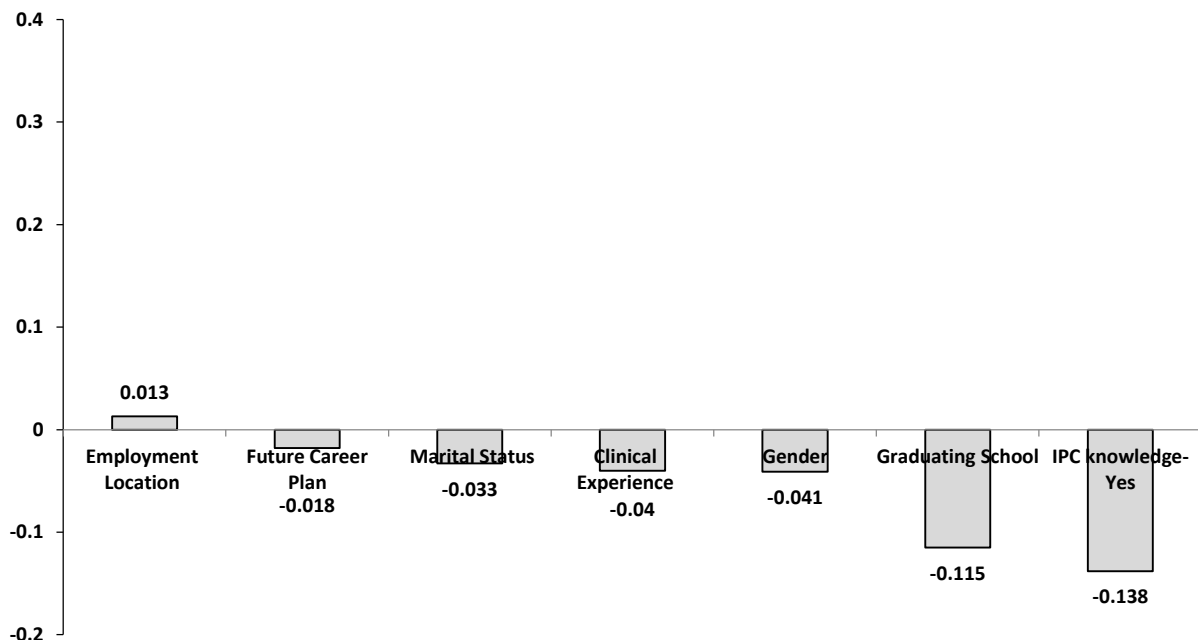


Figure 5.7 Association between the PD JSAPNC and sociodemographic and professional characteristics of participants, Oman, 2018.

5.8 Analysis of Physician Dominance Factor Scale as a Categorical Variable

Table 5.11 shows a comparison between high-IPC and low-IPC groups on the physician dominance (PD) factor scale over selected sociodemographic and professional characteristics of participants. Of the total of 247 participants, 160 (64.8%) were labelled as high-IPC on the PD factor scale and 87 (35.2%) as low-IPC on the PD factor scale. Compared to the low-IPC group, participants with high-IPC on the PD factor scale were more likely to be married females who graduated from SQU medical school, with tertiary care employment, with senior clinical experience, and with a medical career plan. Interestingly, participants with high-IPC on the PD factor scale were less likely to have prior IPC knowledge compared to the low-IPC group on the PD factor scale.

Table 5.11 *Comparative Assessment of High and Low IPC Groups on the PD Factor Scale, Oman, 2018*

Characteristic	High IPC over PD (≥ 5)	Low IPC over PD (< 5)
	(N= 160)	(N= 87)
	N (%)	N (%)
Gender		
Female	105 (65.6)	56 (64.4)
Male	55 (34.4)	31 (35.6)
Employment		
Tertiary	24 (15.0)	12 (13.8)
Primary	136 (85.0)	75 (86.2)
Clinical Experience		
Junior	75 (46.9)	35 (40.2)
Senior	85 (53.1)	52 (59.8)
Marital Status		
Never-married	52 (32.5)	31 (35.6)
Married	108 (67.5)	56 (64.4)
Graduation school		
Non-SQU	44 (27.5)	36 (41.4)
SQU	116 (72.5)	51 (58.6)
Career Plan		
Surgical	106 (66.3)	61 (70.1)
Medical	54 (33.8)	26 (29.9)
IPC knowledge		
No	91 (56.9)	40 (46.0)
Yes	69 (43.1)	47 (54.0)

Table 5.12 shows assessment using directed acyclic graphs (DAGs) on the predictors of the Physician Dominance factor scale. Marital status, graduation university and career plan were positively associated with the physician dominance cofactor.

Table 5.12 *Assessment using DAGs for PD Factor Scale, Oman, 2018*

Characteristic	Crude OR	Adjusted OR (95% CI)	P value
Gender	0.95	0.95 (0.55, 1.64)	0.843
Employment	0.91	0.93 (0.43, 1.98)	0.842
Clinical Experience	0.76	0.69 (0.40, 1.20)	0.189
Marital Status	1.15	1.02 (0.57, 1.83)	0.950
Graduation	1.86	1.86 (1.07, 3.23)	0.535
Career Plan	1.20	1.22 (0.69, 2.16)	0.496
IPC Knowledge	0.65	0.66 (0.39, 1.12)	0.123

Figure 5.8 shows the order of strength of associations as per the adjusted DAGs-based model. Being a graduate from SQU, having a medical career plan, and married marital status were the factors that were positively associated with increased IPC on the PD factor scale.

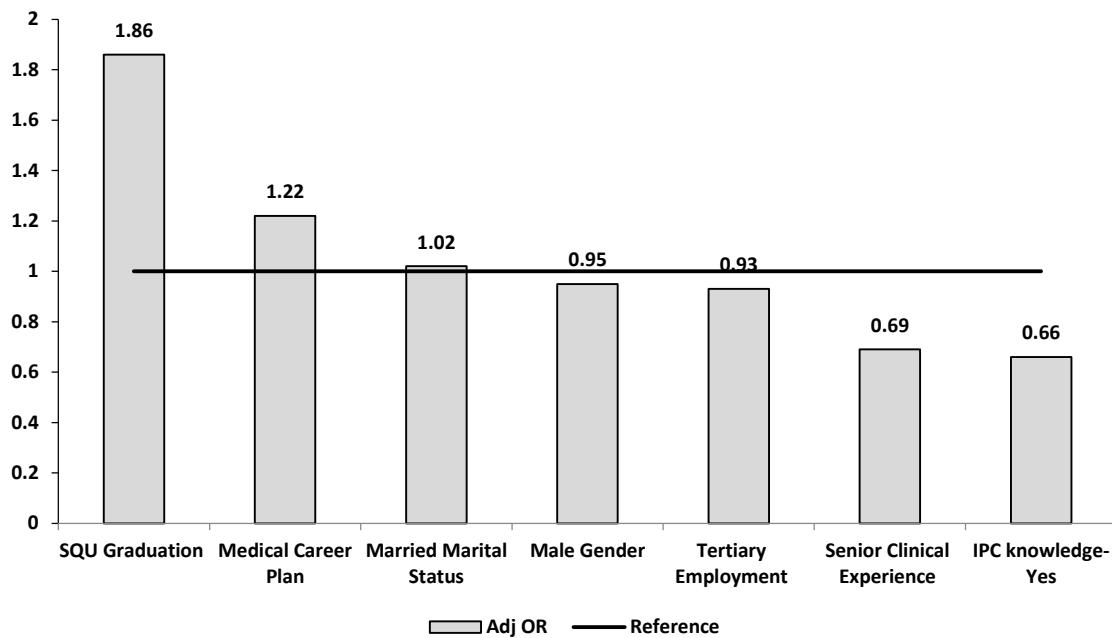


Figure 5.8 Association of sociodemographics and professional characteristics with PD factor scale, Oman, 2018.

5.9 Summary

This chapter has described the analysis of the factor scale of the JSAPNC (ETW, CC, NA, PD) as both continuous and categorical scores. The next chapter presents the results of analysis of data from the focus group discussions.

CHAPTER 6: ANALYSIS OF FOCUS GROUP DISCUSSIONS

Six focus group discussions were conducted with 18 participants, seven males and 11 females. They included three health managers and policy makers, nine physicians, two nurses and four academics from various health, training and academic institutes in Muscat, Oman (SQUH, OMSB, MoH and SQU). They responded to questions centred on two main themes: the definition of interprofessional collaboration (IPC), and the factors facilitating and/or hindering collaboration. Each of these two main themes is elaborated below.

6.1 Definition of IPC

There was a clear division in participants' definitions of collaboration between the different healthcare workers. Physicians tended to provide hesitant and ambiguous definitions, even when these were in the right direction. For example:

It seems to mean cooperation between the different sectors of the medical field (Physician, a1).

In contrast, a senior doctor talked about using the nurses as objects rather than working with them:

I feel I use nurses a lot in the sense that I feel they are very disciplined (Physician, 3a).

Compared with other healthcare professionals, nurses gave clearer definitions and identified the importance of having all professionals working together to improve patient care:

Collaboration means a multi-disciplinary team, and we are all here for the sake of the patient ... So it's not only doctors and nurses (Nurse, c2).

It's between all the health team who's working in the hospital actually (Nurse, c5).

Health managers also gave specific explanations of the concept of collaboration:

It's how different professions in the workplace collaborate with each other for common goals ... The collaborative role used to be one of the teaching pillars for residency education here in Oman (Manager, 3a).

Despite these differences, all participants emphasised the importance of the concept of collaboration and of working together to improve the services delivered to patients:

All to reach the one goal, which is the patient. So if one system fails, it will always cause delay (Nurse, c5).

6.2 Opportunities for and Barriers to IPC

As previously explained (see Chapter 2), viewing collaboration through the D'Amour lens will explore the presence or absence of the determinants towards collaboration. However, the focus will mainly be on relational and organisational determinants. This is the purpose of the FGD. However, in order to get a complete understanding of the determinants of collaboration as Ho et al. (2008) categorised opportunities for and barriers to collaboration into three levels: individual factors (micro), team/ relational factors (meso) and organisational/ structural factors (macro), which was also conducted by Martin-Rodrigues et al. (2005) in relation to the determinants of interprofessional education (IPE), namely: interactional factors, or the interpersonal relationships among team members; internal organisational factors; and systematic factors outside the organisation. The following sections describe the individual, team/ relational and organisational/structural factors identified by participants as factors that facilitated or hindered IPC. These are summarised in Table 6.1.

Table 6.1 *Facilitators of and Barriers to Interprofessional Collaboration*

Analytic Themes	Descriptive Themes	
	Facilitators	Barriers
Organisational/ Structural (Macro) Factors	Education	Rigid system
	Healthy environment and supportive culture	Resources
	Appropriate physical structure	Multi-ethnic culture
	Omanisation	Physical structure
Team/ relational (Meso) Factors	Clear objectives/policies	Hierarchy
	Regular assessments	Busyness
	Acceptance of change	
	Strong leadership	
Individual (Micro) Factors	Friendliness and understanding	Gender
	Buy in	Age and experience
	Respect	Resistance to mind set
	Humility and empathy	Busyness
	Confidence	Language Fear of communication

6.3 Micro Level Factors

6.3.1 Individual factors facilitating IPC

Friendliness and understanding

Being friendly was considered one of the personal characteristics that influenced attitudes towards working together as it helped to break down the hierarchical barriers between professionals. This was mainly identified by junior physicians. For example, Physician a1

commented: “What I noticed from my short experience as an intern ... [was to] be friendly, it is really good”. However, he went on to observe that this was not without limits, and it was important “not to break down all the professionalism between the staff in general, not just doctors and nurses”. Being friendly was associated by another physician with understanding each other and the personal situations that affect collaboration. This helped to maintain a healthy relationship that facilitated working well with others:

Because you understand what's happening. So you know, not only their positive points, also their negatives, so you can work accordingly (Physician, a3).

Buying in

All participants agreed that ‘buying in’ to the process of collaboration was crucial. People not only had to be convinced about the value of IPC but also be empowered by it. As one academic expressed it:

If you want to sell an idea, you have to buy in. I would want to know what are the benefits ... versus what is the return from investment in collaboration (Academic, B3).

However, a nurse observed that administration played a vital role in the success or failure of any initiative:

It's key that we talk to administrators, decision-makers ... so they can initiate, encourage, and enhance this (Nurse, c5).

Respect

Most participants, including senior nurses, senior physicians and interns, acknowledged the importance of respect among all healthcare workers:

I think we are all [human], we should all have the same principles and same skills—communication, respect, transparency (Nurse, c2).

If the senior shows a proper appreciation and respect to the juniors so they will lead by example ... If our senior is respectful, appreciative, and encouraging, that will encourage the others to do the same (Physician, c4).

Nobody is better than the other, so I cannot work as a doctor alone and a nurse cannot work as a nurse alone, so we need to be a full co-operative team together. There should be a mutual understanding and respect and, in the intensity of the moment, I think you can get close, which is good (Physician, c3).

Humility and empathy

Humility was identified by some participants as an important personal attribute that helped to reduce tension and eliminate barriers between professionals. Humility and empathy were sometimes used interchangeably:

So being humble, I think that helps (Manager, 5a).

Empathy. Empathy is a good thing. I mean, empathy and a bit of, I would say, humility and humanity, that you are a human being and part of ... the whole society (Physician, 3a).

Some managers and senior physicians, however, questioned whether it was possible to teach these qualities:

Can we teach somebody to be humble? That's hard because it's something [in] the way you're brought up (Manger, 5a).

Confidence

Confidence as another important personal attribute was mainly discussed in relation to junior doctors and nurses. Nurses observed that a great deal of collaboration takes place when nurses are confident in themselves and their knowledge and speak up:

Nurses feel that they are inferior or subordinate” (Academic, 2a).

One participant related confidence to experience; those nurses with more experience are more confident about discussing issues with others:

If I'm confident, I will learn how to speak to you ... Like the physicians; they are also more set in their ways (Nurse, c2).

6.3.2 Individual factors hindering IPC

Gender

Gender was identified as one of the factors that hinder collaboration. This was attributed to the traditional Omani healthcare culture. For instance:

In a culture like this, most of the nurses are female and by nature in this culture females have -- I mean there are problems with equity and their rights as compared to males (Physician, 4a).

One female physician reported that they did not like to work with male colleagues because they (female physicians) work harder than males and try to finish tasks whereas male physicians depend on them to finish their work. This was particularly the case when they were students:

Male students don't work hard enough and depend on female students to finish the work, which is not fair (Physician, 3a).

Age and experience

Age and experience were other factors identified as having a negative effect on collaboration. It was noted that nursing graduates are younger than medical graduates, which leads nurses to feel less confident when dealing with other professionals:

Age is another factor ... You're putting an 18 year-old ... with a 22- or 23-year-old, who is also labeled as a medical student. So that creates a barrier (Academic, 2a).

Junior doctors identified experience as a barrier not only to collaboration but also to communication between professionals, which can affect the services delivered to patients. Junior doctors explained that they would talk to and interact comfortably with nurses and build good relations with some of them. However, as they grew older some physicians tended to communicate and collaborate less:

Limiting stress in that environment will facilitate communication between the medical staff and the medical team (Physician, a2).

According to one senior manager, however, the issue was less about age than seniority:

Interns are very ready to talk to the nurses because the nurses are more used to that. They've been dealing with this. Then, as they become more senior... it changes ... So I think seniority is one of the issues (Manager, 5a).

Resistance to mind set

Another manager identified a fixed mindset as a factor affecting collaboration. This could be related to prior education or experience. However, this was seen as being amenable to change:

There will be some resistance due to mindsets, due to previous people, previous experiences ... but I think once there's determination to do it, nothing can stop it [collaboration] from happening (Manager, 1a).

Busyness

Both nurses and doctors identified busy schedules as a factor that reduced the amount of collaboration between professionals:

It is maybe their professional situation due to busy work ... but their collaboration is there (Physician, a3).

Language

Language was identified as a barrier to collaboration with non-Omani professionals:

English between nurses and doctors, then Arabic, but the nurse is an expatriate, and may not know a lot of Arabic. To me, that's a challenge (Manager, 1a).

Fear of communication

Interestingly, Academic b4 suggested that fear of communication between professionals could be a barrier to collaboration. This might be due to gender, experience, seniority or even age. According to Academic b4, for instance, nurses and lab technicians are often afraid to communicate with physicians.

6.4 Meso Level Factors

6.4.1 Team/ relational factors facilitating IPC

Clear objectives/policies

The main facilitating factor identified by all participants—doctors, nurses, academics and managers—was the existence of clear policies, objectives and scope of practice for all who are involved in the delivery of healthcare as part of a team. For instance:

It would be good if every team member has his [*sic*] own clear objectives and duties, as specification of his job, and what to do and what not to do (Physician, a1).

This was linked to the standardisation of care:

Unless we have very strong vision, mission, and straight, clear guidelines ... But we all know you have to do [guidelines]. It's not an option. So it's ongoing. But in this, unless we have a very clear vision and we want to enhance IPC between colleges there should be guidelines, policies, funding opportunities, in order [for the colleges] to really rise up (Academic, 2a).

Regular assessments

According to some managers, employees work better when they are assessed and followed up. IPC could be included in the assessment, which would have a positive impact on the delivery of care:

We haven't evaluated whether a collaborator role is an explicit pillar of the framework of residency education, or is implicitly communicated through teaching (Manager, 4a).

Acceptance of change

Both nurses and physicians agreed that acceptance of change by all professionals was important:

I think people are reluctant to say it, and on the other side, they're reluctant to accept it (Nurse, c2).

That's the first thing, we have to be able to accept [change] (Physician, a3).

Leadership

Strong leadership was identified by most participants, both junior and senior, as an important factor in establishing a positive, collaborative environment:

Always if the management or the leadership is in control ... if they have the resources and are in control of the environment, you will feel that [the department] is peaceful and there is harmony with other staff. But if the leadership is nervous, tense, something like that, it will manifest itself [in how other people behave] (Physician, a2).

One manager commented on the organisational arrangements in hospitals in Oman and neighbouring countries:

If you look at hospital departments, you find that nursing has its own separate department, and then each medical department has its own head of department, who is a physician, so the nurses never report on our behalf ... administratively ... to a physician because they have different heads of department. So the Department of Medicine would have nurses and

doctors but each one reports to a different head, which may create issues and problems. I think this is something that we could also think about in terms of learning management and leadership skills (Manager, 1a).

6.4.2 Team/ relational factors hindering IPC

Hierarchy

This factor was raised by junior doctors. One of the interns commented:

Why should we feel there is a huge gap between the senior and the juniors? ... They are all scholars, so we should be under their wing till we are able to pursue our own path (Physician, a4).

Another physician reported:

Collaboration is different as we go up in the hierarchy, for example, nurses will interact with interns (Physician, c3).

Busyness

In academic settings, busy schedules were seen to limit opportunities for collaboration:

Faculty are very busy and I never blame them because they have their own courses, their own college, their own research programs, very busy (Academic, 2a).

6.5 Macro Level Factors

6.5.1 Organisational/ Structural factors facilitating IPC

Education

Education in both medical and nursing schools was seen as a significant factor that could enhance IPC:

[We should] try to see how we can bring health professionals together, provide training together, [this would be] possible because we have a simulation centre. And if you think of the simulation centre, you could simulate a case and bring all of them together (Academic, b3).

This was seen as a way of breaking the ice and bridging any gaps among professionals in the delivery of patient care.

Healthy environment and supportive culture

Healthcare managers stressed the importance of supportive positive cultures in order for healthcare workers to work together:

Culture has its limitations because at the end of the day the actual administrative and managerial work and reporting and evaluations and everything for these workers go to a different administrative structure (Manager, 4a).

Similarly, it was important to have an environment that promotes respect and care towards each other:

In a friendly environment, everyone respects everyone else so we can work even when the centre is a busy. You can work hard because you are comfortable (Physician, a3).

This kind of healthy environment was seen to reduce stress among colleagues and lead to equity:

I think part of it is how the work environment [should place] an emphasis on teamwork, equity and the contribution of every member in the team to healthcare and to the care of patients (Manager, 4a).

Physical environment

The physical environment was also seen as a significant element in collaboration. According to a nurse educator

A very critical element is the physical structure. That can be either hindrance or something positive. I want them to collaborate, I need to create that (Academic, b2).

This was supported by physicians and managers, for instance:

Having the right physical structure is very important to embed this concept (Manager, 4a).

Omanisation

Omanisation refers to the ongoing process of replacing expatriates with Omani health workers. This was raised by the management group, and was justified by the need to address language and cultural difference among expatriates workers and the community:

Omani nurses are firm and know what their job is so they will do it for you. Even if you do not have a good relationship, they will do it for you. But they know if it's their job or not. And if they cannot do it or will not do it, they will tell you, 'I cannot do it' politely (Physician, 3a).

6.5.2 Organisational/ Structural factors hindering IPC

Lack of coordination

The absence of an independent health council that could oversee and assess organisational effectiveness was identified by the managers as an obstacle to IPC. Such a body would ensure that different professionals could come together for the benefit of patients:

There is no council for all health colleges like what exists in other places, so everyone works independently. They learn independently (Manager, 4a).

Additionally, having a rigid system that did not look to the future was seen to limit how people work together:

Rigid systems. Very rigid system. ... We talk about education [but] we use educational methods from our grandfather's age, taught by our fathers to people who will live in the future (Manager, 4a).

Resources

Resources were mentioned by different groups of professionals. One nurse suggested that collaboration could help to maximise resources. Others emphasised the importance of educational infrastructure as a resource for introducing collaboration into the system:

We need to] try to see how we can bring professionals together; train them together
(Manager, 1a).

Multi ethnic culture

According to some physicians, the **multi ethnic culture** in Oman could have both negative and positive impacts on collaboration. Some thought the presence of people from different cultural and educational backgrounds could create problems:

Communication, transparency is very important, especially in this hospital. Really, Oman is a very multi-ethnic country. We get people from different places, with different cultural backgrounds. Not only cultural, even practice backgrounds. We have doctors who graduated from different countries with different medical practices (Physician, c4).

On the other hand, when Omani-educated doctors are exposed to a different cultures in which collaboration works well, the outcome is more promising:

You know, the very interesting thing, for example, when doctors work abroad, they will work very well with nurses and collaborate, but the moment they come [back] here, they stop. I have witnessed this, actually... Why? Because that is the system [here] (Academic, 2a).

Physical structure

The physical structure of both training and work was raised by focus group participants. One administrator observed that the way hospitals are built actively discourages collaboration—“it is no collaboration by design, actually” (Manager, 4a). This was also the case in universities, where

the College of Medicine is completely separated from the College of Nursing and other healthcare-related colleges:

I think this is something that we could also think about in terms of learning management and leadership skills (Academic, 2a).

The current structure of training does not help, does not engage doctors and nurses to collaborate ... So at the macro level, I would say there are some people who have to look at that, but at the micro level, it's also a matter of individual attributes and attitudes (Manager, 1a).

6.6 Summary

This chapter presented the results of analysis of the FGDs in relation to factors at individual team and structural levels. The next chapter discusses the results from both the quantitative and qualitative studies.

CHAPTER 7: DISCUSSION

This thesis provided a new and comprehensive understanding of the factors that influence interprofessional collaboration (IPC) among NGPs and the attitudes of these graduates towards collaboration. IPC has shown to have positive outcomes among patients, different health care professionals and health care systems in general by reducing errors, improving job satisfaction and reducing cost (Hojat et al. 2001; Yildirim et al. 2005). However, tension and conflicts as well as power and authority have always been an undesirable issue among healthcare professionals increasing the need for collaboration (Reeves et al. 2008; Mahboube et al. 2019).

NGPs are the backbone of any healthcare system as they contribute to the practice significantly from the very beginning of their career. They are expected to work in teams with other professionals from the first day. This leads to NGPs feeling overwhelmed and unable to deal with the requirements and expectations from others. This pressure has caused significant burnout among them leading to inability to properly collaborate with others and working in teams.

There is still a significant gap to what is known about how NGPs engage with other members of the team and what are the factors that influence this engagement in IPC. The findings of this research will fill in some of the knowledge gap in literature and direct in developing strategies that may enhance NGP collaboration in healthcare systems.

This chapter discusses the findings of this study on IPC among Newly Graduated Physicians (NGPs) in Oman and identifies its unique contributions to education, practice and research. The first phase of the study surveys the attitudes of NGPs in Oman towards IPC by applying Jefferson Scale of Attitude towards Physicians-Nurse Collaboration (JSAPNC). This chapter

includes a critical analysis of the application of JSAPNC to NGPs in Oman with its four factors: education and teamwork (ETW), caring versus curing (CC), nurse autonomy (NA) and physician dominance (PD). The analysis was unique as DAGs analysis was conducted to identify the sociodemographic and professional characteristics that influence collaboration. This study identified the individual factors that may influence the engagement of NGPs in IPC. The second phase of the study was a qualitative study which provided an exploratory insight of health care professional views, experiences and perceptions of enablers and barriers of IPC in Omani healthcare settings. These are analysed using the Structuration Model of Collaboration (D'Amour et al 2008) which identifies 4 dimensions of collaboration: shared goals and vision, internalisation, formalisation and governance. This study identified the team/ relational and organisational/ structural factors that may influence IPC among NGPs.

The discussion is organised based on the objectives of this research which were:

- I. To conduct a baseline assessment of attitudes of resident doctors in Oman towards IPC
- II. To examine the link between IPC and sociodemographic and professional characteristics.
- III. To assess what healthcare professionals perceive as the prominent enablers of IPC that would impact on the Omani healthcare system.
- IV. To assess what healthcare professionals perceive as prominent barriers of IPC that would impact on the Omani healthcare system.

7.1 Attitudes of Physicians towards IPC

Overall, NGPs in Oman demonstrated favourable attitudes towards IPC with a mean score of 48 on the global scale of JSAPNC. This is comparable to the mean score of 48 obtained among American physicians (Hojat et al, 2003) and Egyptian physicians (El Sayed & Sleem, 2011), but

higher than the mean scores of 45 among Palestinian physicians (Elsous et al, 2017) and Italian physicians (Hojat et al, 2003), and 43 among Lithuanian physicians (Liseckiene et al, 2016). The high JSAPNC score in this current study suggests that a general ‘collaborative spirit’ is widely prevalent among NGPs in Oman. This pattern in Oman fits into the complementary model in which “physicians and nurses share the power and are viewed to have complementary roles and responsibilities in patient care” (Hojat et al, 2003 p.432), in contrast to the hierarchical model “where nurses have very little autonomy, while physicians have a total dominance in patient care decisions” (Hojat et al, 2003 p.432). The results are opposite to what is expressed in literature in which in the Middle Eastern cultures nurses are perceived more often like “handmaidens” and the hierarchical model is expected (Hojat et al. 2003; Yildirim et al. 2005; Karagiannis et al. 2012).

The complimentary attitude of Omani physicians probably stems from socio-cultural factors that are specific to the country. In sociological and anthropological studies, countries like Oman are shown to operate on a ‘collective mindset’ due to upbringing that is ‘oriented toward group affiliation and interdependence’ (Dwairy, 1996 p. 232). Ward et al (2008) highlights the influence of societal roles and cultural norms on collaboration. And while, it remains to be seen whether such socialisation has any bearing on Omani physicians’ complimentary attitudes, this study demonstrates the need to explore this further.

The means JSAPNC score for education and teamwork, caring versus curing, nurse autonomy and physicians’ dominance were 23.3, 9.7, 10.1 & 5.0 respectively. The high score for education and teamwork indicates a greater orientation towards collaborative learning and training among NGPs in Oman. The high score for caring versus curing implies a general positive view of nurses’ contributions to both psychological and educational aspect of care. The high score for

nurse autonomy suggests that NGPs in Oman are favourably disposed to nurses' involvement in decision making towards in healthcare. However, the high score for physicians' dominance indicates that NGPs are still in favour of the dominating role of physicians in patient care. This finding would benefit from exploration in the future to identify the real reasons behind this difference.

7.2 Sociodemographic and Professional Characteristics and IPC

This study explored the association between the sociodemographic and professional characteristics and JSAPNC factor scores after adjusting for potential confounders through DAGs analysis (Rothman & Mohan 2004; Pourhosringholi et al. 2012; Harris & Taylor, 2014). This was used to quantify the probability of falling into a particular group based on the characteristics of the sample group. The results showed that gender and prior knowledge of IPC significantly influence attitudes of NGPs in Oman towards IPC.

One unique feature of the present study is the gender difference in attitudes towards IPC with males showing more favourable attitudes. Male trainees expressed more favourable attitudes towards interdisciplinary collaboration and endorsed a more positive view of nurses' contribution to the psychological and educational aspects of patient care. The study also showed greater agreement with nurse involvement in decisions regarding patient care and policies among male trainees. This study was in consistent with another study conducted in Turkey where male physicians showed more positive attitude towards collaboration (Yildirim et al. 2005). Yildirim et al. (2005) attributed this unexpected result to role theory which suggests that gender is not a powerful factor in prescribing professional roles.

However, other previous studies (Ward et al. 2008; Calabrese et al. 2013) reported more favourable attitudes towards IPC among females. Although Ward et al. (2008) reported gender difference in attitude of undergraduate nursing students in Pennsylvania towards IPC, female nursing students demonstrated more positive attitudes. Ward et al. (2008) attributed such a trend to women's social and communication skills, maternal attitudes, and social learning. Similarly, Calabrese et al. (2013) reported that female medical students in Ohio showed more positive attitude towards collaboration which was attributed to women's tendency to have more empathy compared to males. However, Bell, Michalec & Arenson (2014) cautioned that it is premature to conclude that the female gender is more endowed with temperament relevant to IPC due to under-representation of women in the physician workforce in Euro-American population. Similar views were echoed in the context of the Arab world (Tlaiss, 2013).

Such generalisation may not hold true for Oman. Oman is one of the few countries where, despite its conservative version of Islam, 'feminisation' or 'femininity' of healthcare is a commonality rather than exception (Zezeza 2016; Gjerberg & Kjolsrod 2018). The medical schools in Oman have higher intake and graduation of female doctors (Mohamed et al, 2018). As shown in this study, the majority of those who enrolled in the residency programme in Oman are females. Nevertheless, gender role is still an issue in Oman. According to the latest World Economic Forum global gender gap report (2018) that evaluated gender parity across four dimensions; economic participation and opportunity, educational attainment, health and survival and political empowerment. Oman in this report showed a gender gap of 60% which was among countries with high gender gap. Other countries with high gender gap include the Kingdom of Saudi Arabia and Iraq with gender gap of 59% and 55% respectively. This finding would benefit

from exploration in the future to identify the real reasons behind these differences in gender in Oman in particular and the GCC in general.

While more studies with robust methodology will be required to scrutinise the less favourable attitude of female NGPs in Oman towards IPC, it is possible that socio-cultural factors might partly explain the current result. In a traditional Omani society, women are expected to operate in a domestic sphere in contrast to public sphere for male. Gender segregation is still pervasive in such a patrilineal society (Eickelman, 1984). It is possible that such socio-cultural patterning may impede females from endorsing high preference for IPC. Inuwa (2012) conducted a study among 125 first year medical students in Oman to evaluate the perception towards team-based learning and reported that female students were mainly reluctant to accept mixed gender teams whereas, male students were more motivated to the idea. This was also attributed to traditional societies where females were always segregated from males even at schools and mixing of gender mainly starts indirectly as they enter universities. Future studies need to explore the effects of traditional culture on preference for IPC.

Prior exposure to IPC was another factor that appears to be associated with favourable attitudes in the present study. The highest total mean score was among physicians with previous knowledge on IPC who in addition scored high in the teamwork and shared education factor as well as the care and cure factor. This finding is consistent with another study (Wang et al, 2015) where previous knowledge of IPC contributed positively to the total mean value. Contact Hypothesis or Intergroup Contact Theory suggests that previous contact can have significant effects on cementing positive attitudes (Pettigrew et al, 2011). This implies that increasing exposure by IPE could improve attitude of NGPs towards IPC. In many medical schools in societies in transition such as Oman, there is a tendency to relegate psychosocial subjects, such

as IPC, into the peripheries. In the light of new pattern of diseases and the current demographic trends, medical education in Oman needs to inoculate the future doctors with the valuable knowledge regarding the importance of IPC which is increasingly being recognized as a strong harbinger of better healthcare outcomes (Zwarenstein et al, 2009). Increasing literature have advocated for collaborative education for healthcare students in order to promote positive attitudes towards IPC (Hojat et al. 2001; Yildirium et al. 2005)

7.3 Facilitators of IPC among Healthcare Professionals

7.3.1 Internalisation

Internalisation indicates that health professionals are aware of their interdependencies, appreciates the values of colleagues and demonstrates mutual trust (D'Amour et al 2008). A number of factors identified in this study points towards mutual acquaintanceship and trust which could facilitate IPC. These include friendliness, being understanding, respectfulness, humility, empathy and mutual trust. These factors have also been reported previously in many research literatures (Baggs & Schmitt, 1997; Wear & Keck-McNulty, 2004; Baker & Oandasan, 2005 & Weller et al, 2011).

Mutual friendship among professionals encourages IPC by breaking hierarchical barriers (Wear & Keck-McNulty, 2004). However, it was also reported that being friendly may also affect IPC as other professional may take a friendly doctor for granted or regards such as a soft target for attacks (Wear & Keck-McNulty, 2004). The current study appeared to offer a solution to this by suggesting being friendly with clear limits to ensure that professional boundaries are not overreached. Mutual understanding and respect among healthcare professional facilitate IPC.

The participants advocated for mutual respect among all professionals irrespective of profession or seniority. A doctor is expected to understand the roles of other health professionals and appreciate their important contribution to healthcare delivery (Baggs & Schmitt, 1997).

7.3.2 Shared Goal and Vision

This is the existence and recognition of common patient-centered goals and expectations from all members of the healthcare teams (D'Amour et al. 2008). The study participants acknowledged the importance of setting clear objectives as a means of facilitating IPC among healthcare professional. This agrees with previous studies which strongly recommended setting a clear objective as a force towards teamwork and collaboration (Baggs & Schmitt, 1997; Weller et al, 2011 & Soones et al, 2015). Setting a clear objective provides clear direction for interventions to improve collaboration among healthcare professionals.

7.3.3 Formalisation

Formalisation refers to the availability of policies and procedures within an organisation in order to regulate actions and strengthen the organisational structure (D'Amour et al 2008). Omanisation of the health system is a specific local policy identified by participants as a facilitator of inter-professional collaboration. Participants believed that a predominant Omani healthcare workforce would ease collaboration which is a part of the Omani culture. However, education and proper structural set up have been inconsistent with research literature (Ho et al, 2008; Thomas et al, 2004 & Weller et al, 2011).

7.3.4 Governance

Governance refers to strong leadership that promotes and supports IPC (D'Amour et al 2008). A strong leadership was identified in this study as an important factor that facilitates collaboration

within a team. It is important for the leader to lead by example by buying-in into collaboration. According to Ho et al. (2008), strong leaders bring dedication and persistence to teamwork without which IPC will not succeed.

7.4 Barriers to IPC among Healthcare Professionals

7.4.1 Internalisation

This study identified a number of factors which hinder mutual acquaintanceship and trust thus affecting IPC. These include stress, resistance to change, hierarchy and excessive workload which may strain existing friendship and affect IPC. These factors have also been reported elsewhere in research literature (Herbert et al, 2007; Baggs & Schmitt, 1997 & Thomas et al, 2004).

7.4.2 Shared Goal and Vision

Participants alluded to lack of shared and dynamic vision as a barrier to collaboration. They decried a rigid system which does not encourage collaborative practice among healthcare professionals.

7.4.3 Formalisation

Poor information exchange was identified as a barrier to IPC in Oman. The participants observed that disparity in age and experience may hinder communication and mutual acquaintanceship. Good communication, on the other hand, improves IPC (Weller et al, 2011; Soones et al, 2015).

7.4.4 Governance

The participants reported there was no health council in Oman to oversee health colleges. Thus, absence of health council may weaken clinical education governance and the health colleges may be missing out of strong leadership which could have enhanced IPC. Similar findings were reported in previous studies where organisational structure hindered collaboration (Weller et al, 2011).

7.5 Implication of Study Findings

7.5.1 Implication for practice

Healthcare systems in most societies in transition, including Oman, are characterised by top-down, professionally driven and cure-oriented approaches (Al-Mandhari et al, 2018). With increasing incidence of both communicable and non-communicable diseases, such societies need to foster IPC in their healthcare system. Evidence suggests that the promotion of IPC has direct bearing on the quality and safety of patient care and the resulting outcomes. This research study identified team/relational and organisational/structural factors that are required to facilitate collaboration among NGPs in particular. These factors will help strategy development and ease implementation and engagement of NGPs towards IPC. However, further studies are required to identify specific team/relational and organisational/ structural factors that are required by other professionals to promote collaboration and identify robust strategies that can be implemented and are suitable for all healthcare workers. Further empirical research is required to identify the attitudes of other healthcare professional towards collaboration and to clarify the expectations from different healthcare professionals towards collaboration focus on nurses and physicians as

they are the main players. It is also suggested that more studies are conducted to identify ways to integrate the expanding roles of nurses into the system. Further studies are also required to identify best practices for building effective communicative and collaborative practices across the all healthcare settings and identify successful outcomes from IPC.

7.5.2 Implications for education

Skills required for IPC and team-work are not intuitive (Barsteiner et al, 2007). This research emphasises on the importance to start preparing the current generation of faculty to address the educational needs as well as the service physicians to work better together. IPE has been identified as an educational tool that will assist graduates to enter the workplace with baseline skills and a set of professional competencies that will enable them to function easily within a team.

Opportunities for NGPs to engage in interprofessional related courses should be continued throughout the residency programmes to ensure physicians maintain a positive attitude towards collaboration. This study suggests that those having prior knowledge of or who have been exposed to intricacies of IPC tend to have more positive attitudes. This implies that education plays important role in heightening IPC in medical settings and medical schools should endorse it as part of their curriculum.

Academic institutes are urged to integrate clinical experience and training that fosters professionals and students to practice collaboration in the field. They are required to develop policies that allow and promote collaboration among NGPs.

Although this research encourages the implementation of interprofessional curricular studies during under and post graduate studies further studies are required to assess the current education curriculum and determine what IPE is currently available if any to promote shared experiences among professionals in Oman. It is also important to identify best practices for building effective collaboration between NGPs and other health care professionals mainly nurses to identify what outcome can be attributed to best practice.

7.5.3 Implications for future research

The current study, being the first of its kind in the region, could lay groundwork for further scrutiny on issues pertinent to IPC. This study suggests that males have different attitudes towards IPC as compared to their female counterparts and such findings may be related to various socio-cultural factors. Future studies are therefore needed to explore the role of culture in determining attitudes towards IPC. The impact of specific gender attitudes towards collaboration should also be further explored among NGPs and other healthcare professionals. Further prospective and longitudinal studies are needed to explore where IPE programmes can improve attitudes towards IPC.

This research study is the first to be conducted in Oman and the GCC region hence further study to identify gaps and impact of collaborative practice are required with possible collaboration with other GCC countries for further comparison.

7.6 Strengths and Limitations of the Study

This study is the first study on IPC among NGPs in the GCC. This is important as these sets of doctors are the backbone of the health system. The use of a mixed method design, involving both quantitative and qualitative research methods, is strength of this study. This allowed for better understanding of the research question and ensured that the findings are grounded in the participants' views and experiences.

The use of the Structuration model of IPC model as the conceptual framework is also strength of the study as it is supported the understanding of many of the factors that influence collaboration among NGPs. The findings did emerge from the dimensions of the model, mainly during the focus group discussion as the team/ relational and organisational/ structural factors were highlighted through the model. These factors are important when establishing a strategic plan to be developed to understand and improve collaborative relations between NGPs and other professionals.

However, an important factor that was not included in the structuration model is the individual factor. This is important as individual factors may have an impact on how physicians engage in collaboration and must be considered when with the other factors. The validation of these factors was a central finding of this study in which the attitudes of NGPs was assessed and compared with certain sociodemographic and professional characteristics. The individual factors were assessed through a validated tool the JSAPNC which also has its limitations as described in chapter 2.

The use of DAGs analysis was also a strength to the study as it added statistical confirmatory knowledge to the factors that influence collaboration.

On the other hand, the use of a single profession as participants (physicians only) for the first phase is a limitation. The study was conducted on a specific group of medical trainees attending the Oman Medical Specialty Board training programme. These are elite group of NGPs who underwent examinations and interviews to be selected to join the OMSB programmes. They probably had some training on professionalism, communication skills as well as quality management. Results can be interpreted among OMSB graduates but others who are working at the different institutes in Oman and have not joined the OMSB may have a different opinion. It would have been better if a group representing other NGPs who are not in the OMSB are also included in the study. Such cohorts constitute a convenient sample. This may limit generalisation of the finding to a broader population. Multi-institutional scope with a representative sample is required to allow generalisation of such results. However, the convenience sampling technique enabled the enrolment of a relatively larger sample size and resulted in a high response rate, thereby increased the power of the studies to detect significant differences.

In this study we believe that if we had misclassification it would most likely be a non-differential misclassification because when we started the survey we did not have proper knowledge about sociodemographic and professional characteristics of the participants nor outcome which is the attitude towards collaboration if it was towards favourable or non-favourable IPC. The study was well designed however, that if the study was affected it would be expected to be a non-differential misclassification and so shifted towards the null hypothesis.

During the focus group discussions, the information gathered in the interview could have been affected by recall bias. To circumvent this limitation, a concerted effort was made to maintain the uniformity of the data collection procedures across the study groups to avoid any

misclassification that could occur. This was done through a unified question guide that was developed and used by the interviewer to direct the discussion to track.

Language could also be a potential barrier during the focus group discussion. All participants have a very good working knowledge of English, but their responses may have been limited since the interviews were not conducted in their mother tongue, that is, Arabic. Miscommunication and inappropriate services delivered to patients have been attributed to inefficient collaboration among healthcare professionals. Hence, further studies are required to explore collaborative behaviour among healthcare professionals.

7.7 Conclusion

IPC has been identified as an initiative to improve health outcomes and patient safety. In order to fill the gap in literature, this study explored IPC among NGPs in Oman. It also provided an insight on the factors that promote or hinder collaboration in Oman. Overall, the study provided evidence that NGPs in Oman positively perceived nurse-physician collaboration in general and male physicians in particular demonstrated a more positive attitude towards collaboration.

The study also showed that previous knowledge on IPC as individual factors which impact positively on collaboration among professionals which may subsequently impact on the healthcare services. In addition, the study identified relational and organisational factors which may influence IPC. Factors that may facilitate IPC include friendliness, being understanding, respectfulness, humility, empathy, mutual trust and shared common goal, strong leadership and clear policies. Barriers to communication identified include stress, resistance to change, hierarchy and excessive workload, rigid system and poor communication.

In order to address the complex needs and challenges of healthcare, it is important for health professionals to work together in interprofessional teams (Bridges et al, 2011). It is therefore necessary to implement strategies to promote IPC among healthcare professionals. Such strategies include regular audit and supportive supervision, efficient clinical education governance, clear policies and IPE. It is therefore necessary to implement strategies, such as undergraduate IPE, to promote IPC among healthcare professionals. “The clinician of tomorrow will need to be trained in teams to meet the publics’ health needs” (Speakman & Arenson, 2015)

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Appendices

Appendix 1: CASP Quality Assessment Tool

Appendix 2: OMSB Ethical Approval

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Appendix 1: CASP Quality Assessment Tool



10 questions to help you make sense of qualitative research

How to use this appraisal tool

Three broad issues need to be considered when appraising a qualitative study:

Are the results of the study valid? (Section A)
What are the results? (Section B)
Will the results help locally? (Section C)

The 10 questions on the following pages are designed to help you think about these issues systematically. The first two questions are screening questions and can be answered quickly. If the answer to both is “yes”, it is worth proceeding with the remaining questions.

There is some degree of overlap between the questions, you are asked to record a “yes”, “no” or “can’t tell” to most of the questions. A number of italicised prompts are given after each question. These are designed to remind you why the question is important. Record your reasons for your answers in the spaces provided.

These checklists were designed to be used as educational pedagogic tools, as part of a workshop setting, therefore we do not suggest a scoring system. The core CASP checklists (randomised controlled trial & systematic review) were based on JAMA 'Users' guides to the medical literature 1994 (adapted from Guyatt GH, Sackett DL, and Cook DJ), and piloted with health care practitioners.

For each new checklist a group of experts were assembled to develop and pilot the checklist and the workshop format with which it would be used. Over the years overall adjustments have been made to the format, but a recent survey of checklist users reiterated that the basic format continues to be useful and appropriate.

Referencing: we recommend using the Harvard style citation, i.e.:

Critical Appraisal Skills Programme (2017). CASP (insert name of checklist i.e. Qualitative Research) Checklist. [online] Available at: *URL*. Accessed: *Date Accessed*.

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Screening Questions

1. Was there a clear statement of the aims of the research?

☐ Yes

☐ Can't tell

☐ No

HINT: Consider

- What was the goal of the research?
- Why it was thought important?
- Its relevance

2. Is a qualitative methodology appropriate?

☐ Yes

☐ Can't tell

☐ No

HINT: Consider

- If the research seeks to interpret or illuminate the actions and/or subjective experiences of research participants
- Is qualitative research the right methodology for addressing the research goal?

Is it worth continuing?



Detailed questions

3. Was the research design appropriate to address the aims of the research?

☐ Yes

☐ Can't tell

☐ No

HINT: Consider

- If the researcher has justified the research design (E.g. have they discussed how they decided which method to use)?

4. Was the recruitment strategy appropriate to the aims of the research?

☐ Yes

☐ Can't tell

☐ No

HINT: Consider

- If the researcher has explained how the participants were selected
- If they explained why the participants they selected were the most appropriate to provide access to the type of knowledge sought by the study
- If there are any discussions around recruitment (e.g. why some people chose not to take part)

5. Was the data collected in a way that addressed the research issue?

☐ Yes

☐ Can't tell

☐ No

HINT: Consider

- If the setting for data collection was justified
- If it is clear how data were collected (e.g. focus group, semi-structured interview etc.)
- If the researcher has justified the methods chosen
- If the researcher has made the methods explicit (e.g. for interview method, is there an indication of how interviews were conducted, or did they use a topic guide)?
- If methods were modified during the study. If so, has the researcher explained how and why?
- If the form of data is clear (e.g. tape recordings, video material, notes etc)
- If the researcher has discussed saturation of data

6. Has the relationship between researcher and participants been adequately considered?

☐ Yes

☐ Can't tell

☐ No

HINT: Consider

- If the researcher critically examined their own role, potential bias and influence during
 - (a) Formulation of the research questions
 - (b) Data collection, including sample recruitment and choice of location
- How the researcher responded to events during the study and whether they considered the implications of any changes in the research design

7. Have ethical issues been taken into consideration?

☐

Yes

☐

Can't tell

☐

No

HINT: Consider

- If there are sufficient details of how the research was explained to participants for the reader to assess whether ethical standards were maintained
- If the researcher has discussed issues raised by the study (e.g. issues around informed consent or confidentiality or how they have handled the effects of the study on the participants during and after the study)
- If approval has been sought from the ethics committee

8. Was the data analysis sufficiently rigorous?

☐

Yes

☐

Can't tell

☐

No

HINT: Consider

- If there is an in-depth description of the analysis process
- If thematic analysis is used. If so, is it clear how the categories/themes were derived from the data?
- Whether the researcher explains how the data presented were selected from the original sample to demonstrate the analysis process
- If sufficient data are presented to support the findings
- To what extent contradictory data are taken into account
- Whether the researcher critically examined their own role, potential bias and influence during analysis and selection of data for presentation

9. Is there a clear statement of findings?

☐ Yes ☐ Can't tell ☐ No

HINT: Consider

- If the findings are explicit
- If there is adequate discussion of the evidence both for and against the researchers arguments
- If the researcher has discussed the credibility of their findings (e.g. triangulation, respondent validation, more than one analyst)
- If the findings are discussed in relation to the original research question

10. How valuable is the research?

HINT: Consider

- If the researcher discusses the contribution the study makes to existing knowledge or understanding e.g. do they consider the findings in relation to current practice or policy?, or relevant research-based literature?
- If they identify new areas where research is necessary
- If the researchers have discussed whether or how the findings can be transferred to other populations or considered other ways the research may be used

Appendix 2: OMSB Ethical Approval

SULTANATE OF OMAN
OMAN MEDICAL SPECIALTY BOARD



سلطنة عُمان
المجلس العماني للاختصاصات الطبية

No: 1582/2/10/2017
Date: 13/November/2017

REF. NO. REC/10/2017

Dr. Heba Awadh Al-Ajmi
PhD Student at Imperial College, London

After compliments,

Sub: Ethical Approval of the Study "The Attitudes of Newly Graduated Physicians towards Interprofessional Collaboration; An Explorative Study"

I would like to inform you that the abovementioned proposal submitted to the Research and Ethics Committee of Oman Medical Specialty Board is approved.

We wish you a productive study with your research work.

Yours sincerely,

Dr. Abdullah Ali Al Maniri
Chairman of Research & Ethics Committee



Appendix 3: Ministry of Health Ethical Approval

Sultanate of Oman
Ministry of Health
Directorate General of Planning & Studies



سلطنة عُمان
وزارة الصحة
المديرية العامة للتخطيط والدراسات

Ref. MoH/DGPS/CSR/PROPOSAL_ APPROVED /7/2017

Date : 8.3.2017

الرقم:
التاريخ:
الموافق:

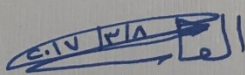
Heba Al Ajmi
Principal Investigator

Study Title : "The attitudes of newly graduated physician in Oman towards inter-professional collaboration"

After compliments

We are pleased to inform you that your research proposal "The attitudes of newly graduated physician in Oman towards inter-professional collaboration" has been approved by Research and Ethical Review & Approve Committee, Ministry of Health.

Regards,





Dr. Ahmed Mohamed Al Qasbi
Director General of Planning and Studies
Chairman, Research and Ethical Review and Approve Committee
Ministry of Health, Sultanate of Oman.

Cc
Day file

Appendix 4: Survey Questionnaire



A study on the attitudes of newly graduated physicians towards interprofessional collaboration

Dear Doctor:

After Compliments;

This is a study that is conducted by a PHD student at Imperial College on Inter-professional collaboration (IPC). IPC is an essential component to advance medical education, collaboration and training programs.

Research aims:

This project aims to comprehensively understand the engagement of newly graduated doctors who work in various healthcare institutes towards inter-professional collaboration and assess what are the main factors that influence this collaboration. Kindly take this opportunity to tell us about your experience towards interprofessional collaboration.

Acceptance participation signature:

Your participation will shape an understanding of your experience towards IPC.

Data Confidentiality & Anonymity

The survey will take 10 minutes of your time. Your participation in this project is entirely voluntary and you can withdraw from the research at any time and in any stage of your survey completion. Your answers will be used on an anonymous basis and for research purposes only.

At the end, the survey is NOT a test, so there are no correct or wrong answers as long as your answers indicate and express what you do or feel in your real life experience

Date:

Section One						
1. What is your gender?	Male			Female		
2. Where you are currently based?	Primary Healthcare Facility		Secondary Healthcare Facility		Tertiary Healthcare Facility	
3. Which residency year are you currently?	First year Resident	Second Year Resident	Third Year Resident	Fourth year Resident	fifth year Resident	Sixth year Resident
4. What is your marital status?	Single		Married		Divorced	
5. Where did you graduate from?	Sultan Qaboos University		Oman Medical College		Others; specify	
6. What are your future career plans?	Medical			Surgical		
7. Have you taken a course in interprofessional education or collaboration	Yes			No		
8. Would you be interested in a Follow-up interview?	Tel no:	Yes			No	
9. Graduation year from MD						

A study on the attitudes of newly graduated physicians towards interprofessional collaboration

Section Two					
10.	Physicians should be educated to establish collaborative relationships with other professionals	Strongly Agree	Agree	Neither/ Neutral	Disagree Strongly Disagree
11.	Interprofessional relationship between physicians and nurses should be included in their professional programme	Strongly Agree	Agree	Neither/ Neutral	Disagree Strongly Disagree
12.	Nurses should be involved in making policy decisions concerning the hospital support services upon which their work depends	Strongly Agree	Agree	Neither/ Neutral	Disagree Strongly Disagree
13.	Nurses should have responsibility for monitoring the effects of medical treatment	Strongly Agree	Agree	Neither/ Neutral	Disagree Strongly Disagree
14.	Nurses should clarify a physician's order when they feel it might have the potential for detrimental effects on the patient	Strongly Agree	Agree	Neither/ Neutral	Disagree Strongly Disagree
15.	Nurses should be involved in making policy decisions affecting their working conditions	Strongly Agree	Agree	Neither/ Neutral	Disagree Strongly Disagree
16.	A nurse should be viewed as a collaborator and colleague with a physician rather than his/her assistant	Strongly Agree	Agree	Neither/ Neutral	Disagree Strongly Disagree
17.	Nurses are qualified to assess and respond to psychological aspects of patients' needs	Strongly Agree	Agree	Neither/ Neutral	Disagree Strongly Disagree
18.	Nurses have special expertise in patient education and psychological counselling	Strongly Agree	Agree	Neither/ Neutral	Disagree Strongly Disagree
19.	Nurses should be accountable to patient for the nursing care they provide	Strongly Agree	Agree	Neither/ Neutral	Disagree Strongly Disagree
20.	During their education, medical and nursing students should be involved in teamwork in order to understand their respective roles	Strongly Agree	Agree	Neither/ Neutral	Disagree Strongly Disagree
21.	Physicians and nurses should contribute to decisions regarding the hospital discharge of patients	Strongly Agree	Agree	Neither/ Neutral	Disagree Strongly Disagree
22.	There are many overlapping areas of responsibility between physicians and nurses	Strongly Agree	Agree	Neither/ Neutral	Disagree Strongly Disagree
23.	Doctors should be the dominant authority in all health care matters	Strongly Agree	Agree	Neither/ Neutral	Disagree Strongly Disagree
24.	The primary function of nurses is to carry out physician's order	Strongly Agree	Agree	Neither/ Neutral	Disagree Strongly Disagree

Appendix 5: Focus Group Discussion Participation Sheet

Interprofessional Collaboration among Newly Graduated Physicians Focus Group Participant Information Sheet

Dear Colleagues

After Compliments;

Introduction

Interprofessional Collaboration (IPC) is an essential component to advance medical education, collaboration and training programs. This is a study that will evaluate if Newly Graduated Physicians are adequately prepared and trained to work collaboratively with other professionals such as nurses etc. This study is conducted by Dr Heba Awadh, a PHD student at Imperial College under the supervision of Professor Salman Rawaf, Director of the [WHO Collaborating Centre for Public Health Education and Training](#), Imperial College and Dr Yahya Al Farsi, Associate Professor, College of Medicine, Sultan Qaboos University. The study has been ethically approved by both the Ministry of Health Oman and the Oman Medical Specialty Board.

I would like to invite you to be part of this research. Your participation in this research will help us in advancing the knowledge on a novice but important topic in healthcare and shape an understanding of your experience towards collaboration.

Objectives

The following are the objectives we will be covering

- 1- Assess the status of interprofessional collaboration in Oman
- 2- Explore the factors that would facilitate/ inhibit collaboration among newly graduated physicians
- 3- Identify the impact of pre and post-graduate training on future collaboration
- 4- Assess the issues that could assist/ challenge in future collaboration among newly graduated physicians

General rules

The discussions will take place at the Sultan Qaboos University College of medicine and/ or Oman Medical Specialty Board. It will be attended by the people who will take part in the discussion and the research team only. The discussion will be recorded entirely and kept with the Dr Heba in a safe place. The information recorded is confidential in which only the research will have access to (researcher- Dr Heba). The tapes will be destroyed after 5 years from the date of reporting the results of the study.

The following are some information which will be of interest to your participation in this research. The discussion will be conducted in groups of 4-6 people. It is important to take the time and provide us with spontaneous and considered opinions on the topic asked by the group leader. If you would like to revise your opinion before the discussion ends kindly inform the group leader before leaving the room today. I would like to highlight some points before we start:

- There are no right or wrong answers, only differing points of view.
- We're tape recording, so kindly one person speaks at a time.
- We will be on a first name basis.
- You don't need to agree with others, but you must listen respectfully as others share their views.
- Rules for cellular phones and pagers if applicable: For example: We ask that you turn off your phones or pagers. If you cannot and if you must respond to a call please do so as quietly as possible and re-join us as quickly as you can.
- My role as moderator will be to guide the discussion.

There will be no incentives given for taking part in the discussion or any direct benefit to you, but your valuable participation will help us develop better strategies for the future for the country.

I would kindly like to request you not to discuss any of the information discussed among the group elsewhere. In other words, kindly keep what is discussed in the group confidential.

Your participation in this research is voluntary and you can withdraw from the research at any stage of the discussion. Your answers will be used on an anonymous basis for this research purpose only.

At the end I would like to highlight that this research is not a test, so there are no correct or wrong answer as long as your answers indicate and express what you really think and experience.

Thank you very much for your cooperation and support.

Researcher: Dr Heba Awadh

Email: ha5113@ic.ac.uk

Appendix 6: ISQuA Poster Presentation Approval, September 2018

ISQuA 2018 - Abstract Notification (EP) ▸ Inbox x ha5113@ic.ac.uk x



ISQuA Abstract - GVA - 2018 <isqua2018abs@mci-group.com>
to ha5113@ic.ac.uk ▾

Apr 26, 2018, 1:13 PM



ISQuA 2018 – Abstract Notification Letter

Dear Heba Awadh,

Thank you for submitting your abstract for ISQuA's 35th International Conference, which will take place in Kuala Lumpur, Malaysia from 23rd – 26th September 2018.

On behalf of the Scientific Programme Committee, we have the great pleasure to inform you that the following abstract has been accepted as a **10 minute E-Poster Oral Presentation**:

Submission N°: ISQUA18-2626

Title: Attitudes of newly graduated physicians in Oman towards interprofessional collaboration

Guidelines for your presentation will be available on the ISQuA Conference Website from Mid – May.

Your poster will be available on the ISQuA website and App via an E-poster portal. You will also receive information concerning the upload of your e-poster, which you will be required to present for 10 minutes at the designated E-Poster portal.

Appendix 7: Arab Public Health Conference Oral Presentation Approval, April 2019

The 2nd Arab public Health Conference: Acceptance of submission

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to me, Heba, Ela ▾

Sun, Mar 10, 8:51 PM ☆ ↶ ⋮

Dear Dr Mohammed

On behalf of the Scientific Committee chaired by Professor Tawfik Khoja I would like to inform you that you submission on:

Attitudes of medical trainees in Oman towards inter-professional collaboration: a cross-sectional study

was accepted as ORAL PRESENTATION at the above Conference. Congratulations. We will be in touch shortly with the draft programme including the date of your presentation, as all accepted submissions are spread across the 3 days programme. Please register on the Conference website if you didn't do so (see below) and send us a photo and short bio (no more than 50).

Our 2nd Public Health Conference, held under the Patronage of His Majesty King Mohammed VI of Morocco, themed "*Opening the Door for Public Health in All Policies*" will focus on modern approaches to shape health systems and health services; interventional public health; targeted public health; public health innovation, and dynamic and integrated primary care service based on family medicine.

We have received over 300 abstracts and the list of participants is growing quickly. Our host Mohammed VI Medical University, the many partners and collaborators of across the Arab World and ArPHA Members are keen to make this conference a success for the benefit of our populations in the 22 Arab Countries. Hence this Conference is exclusively run and managed by the Members of ArPHA.

For updates about the Conference please visit the ArPHA website which include the draft programme (will be posted on the Monday 11th March) and the updated conference guide: <http://www.arpha.org/arpha-conference/>

Appendix 8: Prospero Registration



PROSPERO
International prospective register of systematic reviews

Factors influencing newly graduated physicians' engagement in Interprofessional Collaboration (IPC); a systematic review

Azeem Majeed, Salman Rawaf, Yahya Al Farsi, Heba Ibrahim Awadh

Citation

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https://www.crd.york.ac.uk/prospERO/display_record.php?ID=CRD42018084184

Review question

What are the factors that influence newly graduated physicians' engagement in Interprofessional Collaboration

The main aim of the study is to critically analyse the barriers and facilitators to newly graduated physician engagement in interprofessional collaboration. This will be by answering 3 main questions:

- 1- What are the factors (enablers and challenges/ opportunities) that contribute to interprofessional collaboration among newly graduated physicians.
- 2- Which of these factors would promote collaboration among newly graduated physicians? And finally

Appendix 9: Health and Health Education Systems in Oman

Demography of Oman:

The Sultanate of Oman is located on the south-east of the Arabian Peninsula. It has a total area of 309,500 km², making it the third largest country on the Arabian Peninsula. Its coastline of approximately 3,165 km extends from the Strait of Hormuz in the north to the border with the Republic of Yemen in the south (Figure 1). For administrative purposes, the Sultanate is divided into 11 Governorates with 61 Wilayats.

Oman has a population of 4.15 million, of which 2.35 million (59%) are male and 1.8 million (41%) female. The population includes Omani citizens (2,325,982) and expatriates (1,892,143). It is a young population with a median age of 19 years. Only 4.9% of the population is aged over 60 years; the majority (41.2%) comprises children under 15 years (NCSI, 2014).

The climate varies according to location. In the coastal areas the climate is hot and humid in summer. The interior is hot and dry during the summer. However, high areas have moderate pleasant weather throughout the year. The Governorate of Dhofar in the southern part of the country is an exception, with heavy monsoon rain expected from June to October (MoH 2014).



Figure 1: Map of Oman

Oman is currently classified as a high-income country with a gross domestic product (GDP) of 17,231.637 USD (MoH 2014). The Sultanate's economy is mainly dependent on crude oil and gas. The commercial export of oil and gas, which began in 1967, constituted about 81% of total government revenue in 2010 and 84.7% in 2012, an increase from 78.4% in 2000. As the world becomes less dependent on oil, the development of non-oil industrial sectors, such as fishing, tourism and agriculture, is encouraged and is anticipated to increase from 7.5% to 29% by 2020 (NCSI 2014).

Health System

The health system in Oman provides universal coverage for all citizens, Omanis and expatriates (MoH 2014). Healthcare services are government-funded and free for Omanis and for non-Omanis who work in the government sector. Oman spends 2.4% of GDP on health, or 15.23

USD per capita (Alshishtawy 2010). Some 83.1% of hospitals and 92.5% of hospital beds are funded by the government, as are 77.5% of doctors, 85.7% of nurses and 77.4% of other public healthcare workers. Some 72.5% of pharmacists and 63.5% of dentists work in the private sector (MoH 2014).

The Ministry of Health is the main provider of healthcare services. It is also responsible for planning and for policy development and implementation. Other public sector health service providers are the Sultan Qaboos University Hospital, Royal Oman Police, Petroleum Development Oman, Armed Force Hospital and the Medical Services of Diwan Royal Court.

Healthcare delivery is mainly based on a primary healthcare approach under which all patients have easy access to services in nearby residential areas. If required, patients are referred from the primary healthcare centres to secondary or tertiary care facilities.

There are 174 health centres distributed throughout the Sultanate, 74 of which have maternity facilities and 21 are extended health centres with beds but no maternity facilities. These health centres provide preventive, curative and promotive care. Secondary care, including surgery, is provided through regional or sub-regional hospitals. Four national referral hospitals, also known as tertiary centres, are located in the capital, Muscat, and serve the entire country (MoH 2016). The system is depicted in Figure 2.

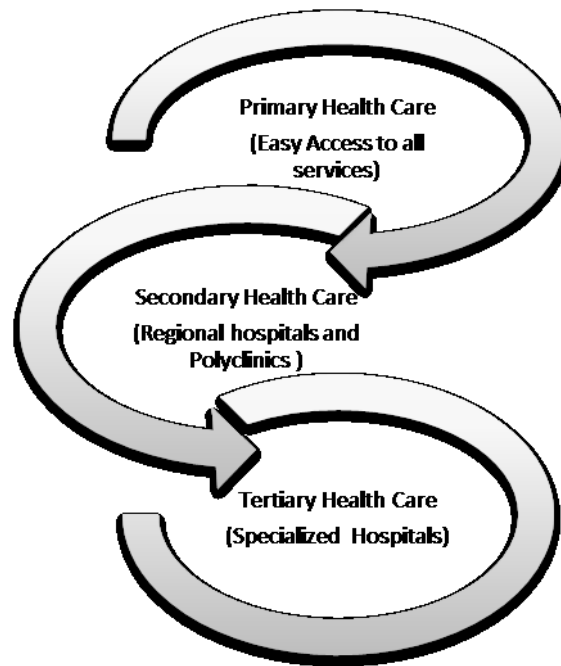


Figure 2: Structure of the Omani Health System

Health Achievements in Oman

The Sultanate of Oman has made remarkable progress in healthcare over the past four decades, resulting in significant improvements in the overall health of the population. The standard of health services in Oman is currently comparable to those provided in industrialised nations. For example, the child mortality rate has declined by 65% over the past three decades (Alshishtawy 2010), health service delivery has improved and life expectancy has increased to 74 years, representing an additional 13 years over the past 3 decades (Al Dhawi et al. 2007).

Oman has received international recognition for several of its achievements. In 1997 it was recognised by UNICEF for controlling childhood diseases such as poliomyelitis, diphtheria and tetanus and was ranked among the leading countries in the Middle East and Africa (Al Dhawi et al. 2007). In 2000, Oman's healthcare system was ranked first in the world for its financing

efficiency and the eighth best healthcare system. In the following year, the World Health Organization (WHO) ranked Oman number one for its remarkable performance in reducing child mortality rates and in 2008 it identified Oman as a successful example of health care modelling (Alshishtawy 2010).

The main challenge facing Oman is the result of the epidemiological and demographic transition the country is currently undergoing. This transition not only affects the health system but also impacts on the social determinants of health, including lifestyle changes (WHO 2017). The resulting challenges include an increase in the burden of non-communicable, chronic diseases, mental health conditions, substance abuse and injuries. These are mainly related to changes in individual lifestyle and are difficult to manage via traditional public health measures (MoH 2014).

Currently, one of the Sultanate's main priorities is its commitment to universal health coverage. Health policies are being developed based on the principles of primary health care, universal health care, equity in distribution and fairness in financial contribution (WHO 2017; MoH 2014).

Health Workforce

One of the Sultanate's early development initiatives was to build a strong healthcare infrastructure. Following the Omani renaissance in 1970, this was achieved by importing professionals from nearby countries such as India, Pakistan and Egypt (Ghosh 2009). However, to secure a sustainable future, policy makers focused on creating a national workforce and achieving workforce self-reliance.

In 1970, only 13 physicians and a small number of nurses were working in the health sector. Between 1985 and 2007, the number of physicians working in the Ministry of Health (MoH) had

increased 5.4-fold, from 638 to 3,459, representing an increase from 0.18 per 10,000 to 17.9 per 10,000 of the population (Lakhtakia 2012; Ghosh 2009). By the end of 2004, the number of medical specialists had risen to 225 (Ghosh 2009). According to the 2016 Oman Ministry of Health annual report, there were 7,673 physicians working in its health facilities, and Omani physicians represented around 35% of the healthcare workforce (MoH 2016). During this period the Sultanate emerged from a period in which it mainly depended on expatriates to one in which local nationals are equally qualified to face future health challenges.

Intense efforts have been made to develop a national workforce including a range of health professions in line with the policy emphasis on Omanisation. In 1975, there were only 450 nurses working in Oman, most of whom were expatriates. Today, 16,930 nurses work in various healthcare facilities in Oman, 62% of whom are Omani (MoH 2013). The quality of healthcare depends on the quality of this workforce and their ability to work together in teams.

Accordingly, physicians are expected to hold postgraduate level qualifications. Yet only 29% of doctors practicing in Oman are nationals (Ghosh 2009). It is proving challenging to produce enough doctors with sufficient capabilities and experience and even more challenging to retain them given the worldwide demand for doctors, particularly in neighbouring countries. The situation in relation to other healthcare workers is also challenging, but to a lesser extent.

Despite the remarkable achievements of the Omani health system in building a strong local workforce, there are still many shortages that need to be filled. Like many countries, Oman is experiencing an epidemiological transition from acute to chronic diseases that requires more highly qualified specialists than are currently available. The sustainability of healthcare in Oman depends not only on upgrading and building new physical infrastructure but also on developing a national workforce that can meet the needs of the population (Ghosh 2009; MoH 2016).

Health Education and Training

Before 1970 Oman struggled with endemic diseases, illiteracy and poverty. One of the first acts of the new leader, His Majesty Sultan Qaboos bin Said, was to improve the country's educational and healthcare facilities (White 2012), since a focus on human capital is essential for economically developing countries.

Several reforms have taken place in health education to build the capacity and capabilities of health professionals and improve health outcomes. The first modest health services institutes were established in 1959 (MoH 2016), but it was not until 1982 that a major health sciences education institution was established to provide medical laboratory courses (Ghosh 2009). Oman's first medical college (College of Medicine and Health Sciences) was established in 1986 at the Sultan Qaboos University in Muscat. The first intake comprised 45 students who had passed the high school diploma with exceptional grades from different regions in Oman. Prior to this, Omani students had to travel abroad to complete their medical degrees. In 1991, Oman's first strategic health workforce plan provided a major boost to the education system. The Oman Medical Special Board (OMSB), the highest supervisory body of postgraduate training, was established in 1994, followed in 2001 by a private medical school, Oman Medical College (OMC).

Many physicians have graduated from these two institutions, although a small number continue to be trained abroad. A total of 1,676 medical practitioners graduated from SQU between 1993 and 2012, and 264 physicians have graduated from Oman Medical College (MoH 2014). Today more than 200 medical students graduate every year from these two colleges (TAWS 2014). Both are accredited by international bodies—the General Medical Council of the United Kingdom and the University of West Virginia in the United States, respectively (MoH 2014).

The Oman Medical Specialty Board was established through collaboration between Sultan Qaboos University and the Ministry of Health. It is an autonomous organisation and is the highest supervisory body of postgraduate medical training, overseeing 18 specialty programmes (OMSB 2018). When the OMSB was established, only 75 residents were enrolled in its programmes (OMSB, 2018). In 2016 there were 146 residents enrolled in the 18 programmes, of whom 101 were female and 45 were male (OMSB 2018). The highest numbers studied general medicine, followed by child health and family and community medicine (FAMCO). Between 2016-2017, 614 residents were enrolled and 107 graduated. Some 658 students are sent abroad by the Ministry of Health to pursue postgraduate study in different specialties. On their return, they bring new experiences and technologies that can be adopted in Oman (OMSB 2018).

Medical education in Oman differs from education in other fields at both undergraduate and postgraduate levels with regard to content, length and awarded degrees. Undergraduate medical education lasts approximately seven years and is followed by a one-year internship, after which graduates are awarded their first professional undergraduate degree—Medical Doctor (MD) or *Medicinae Baccalaureus Baccalaureus Chirurgiae* (MBBS)—and are allowed to practice medicine under supervision as physician trainees. They must then spend an additional 5-7 years in specialised higher education, preferably on the basis of fellowships.

The most recent reform has involved a shift in the curriculum towards a focus on patients and population and on interprofessional and team-based education, as well as IT-empowered learning (White 2012). Inuwa (2012) has argued that it is crucial for interprofessional education (IPE) to be provided in Sultan Qaboos University.

Despite the number of physicians graduating every year from the various institutes, the 2014 MoH report indicated that around 7,500 physicians and 2,800 specialists needed to be recruited by 2050 if the physician-population ratio was to reach the levels seen in developed countries.