

Community attitudes and gendered influences on decision making around contraceptive implant use in rural Papua New Guinea

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38 **Abstract**

39 Background

40 Despite targeted interventions to improve contraceptive implant acceptability and uptake in rural
41 Papua New Guinea (PNG), ongoing use of this method remains limited. Previous literature has
42 suggested community attitudes and intrinsic factors within the decision-making process may be
43 negatively impacting on implant uptake, however these elements have not previously been studied
44 in detail in this context. We set out to explore community attitudes towards the contraceptive
45 implant and the pathways to decision making around implant use in a rural community on Karkar
46 Island, PNG.

47 Methods

48 We conducted 10 focus-group (FGD) and 23 in-depth interviews (IDI) using semi-structured topic
49 guides. Key sampling characteristics included age, exposure or non-exposure to implants, marital
50 status, education and willingness to participate in discussion. Four FGDs were held with women,
51 four with men and two with mixed gender. IDIs were carried out with five women (current implant
52 users, former implant users, implant never users), five men, five religious leaders (Catholic and non-
53 Catholic), four village leaders and four health workers. Two in-depth interviews (four participants)
54 were analysed as dyads and the remaining participant responses were analysed individually.

55 Results

56 Men were supportive of their wives using family planning but there was a community-wide lack of
57 familiarity about the contraceptive implant which influenced its low uptake. Men perceived family
58 planning to be 'women's business' but remained strongly influential in the decision making
59 processes around method use. Young men were more receptive to biomedical information than
60 older men and had a greater tendency towards wanting to use implants. Older men preferred to be
61 guided by prominent community members for decisions concerning implants whilst young men were
62 more likely to engage with health services directly.

63 Conclusions

64 In communities where a couple's decision to use the contraceptive implant is strongly coloured by
65 gendered roles and social perceptions, having a detailed understanding of the relational dynamics
66 affecting the decision-making unit is useful in targeting future healthcare interventions. Engaging
67 groups who are reluctant to connect with health information, as well as those who are most
68 influential in the decision making process, will have the greatest impact on increasing implant
69 acceptability and uptake.

70 **Keywords**

71 Long-acting-reversible-contraception, contraceptive implant, decision-making, gender, inequality,
72 rural Papua-New-Guinea

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77 **Plain English Summary**

78 Contraceptive implants are a reliable and reversible form of birth control which can effectively
79 reduce the number of women who die from complications associated with childbirth. Papua New
80 Guinea is an island nation in the Pacific region in which high numbers of women continue to die in
81 childbirth but where very few women are using implants. In these regions, complex factors
82 influence a woman's decision to use birth control, as well as the type of method she chooses to use.
83 We used an interview based design to study in detail the decision-making processes surrounding the
84 use of the contraceptive implants and focused on how men and women interact with one another
85 and their communities within this process. We centred our study in one rural community on Karkar
86 Island, Papua New Guinea and discovered that, concerning the use of implants, men were more
87 influential in the decision making process than women. All members of the community reported the
88 need to feel as though they could 'trust' a method before they used it and most persons did not
89 know enough about the implant. Older men were reluctant to learn about the implants from health
90 workers, preferring to liaise with their village leader or religious leader. In contrast, younger men
91 were more open and pro-active to learn about implants by approaching health services directly.
92 These findings may help to guide health planners who are hoping to expand access to contraceptive
93 implants in rural communities throughout Papua New Guinea.

94 **Introduction**

95 The acceptability and uptake of long acting reversible contraception in many low and middle-income
96 countries (LMIC) is shaped by a complex interplay of factors including organizational logistics,
97 challenging geography, sparse human service resourcing issues and a lack of integration and
98 understanding of the diversity of traditional knowledge and practices around reproductive health
99 [1—4]. Qualitative research from these diverse settings also highlight the broader gendered issues
100 which underpin key differences in men and women's attitudes towards reproductive health and

101 impact upon uptake of the various contraceptive methods available [4—9]. While research around
102 the use of modern contraception in LMICs is expanding [1—3], the existing literature on how gender,
103 as a relational issue, impacts upon the decision-making process to accept long acting reversible
104 contraception is in its infancy. This is especially the case in the highly gendered setting of Papua New
105 Guinea (PNG), the focus of this paper.

106 PNG is a culturally diverse archipelago nation in the Pacific and has one of the highest fertility rates
107 and one of the lowest modern contraceptive prevalence rates globally [2,3]. A predominately rural
108 population (>85%), the actual fertility rate in rural settings has been consistently higher than the
109 reported desired fertility rate for the past decade [10]. The unmet need for contraception in these
110 areas persists at 34.2% with long acting reversible contraception only making up 2% of in-use
111 methods [10—13]. There is a growing body of evidence in support of long acting reversible
112 contraception, and in particular the contraceptive implant, becoming the preferred method of
113 contraception in LMICs given their high efficacy rates, cost effectiveness, mild side effect profile, low
114 complication rate, non-user-dependent administration, minimally invasive design and technical
115 simplicity for insertion and removal [2, 14,15]. Since 2013 there have been concerted efforts to
116 improve access of contraceptive implants across PNG via outreach programs led by local health
117 authorities and non-government organisations [2,16].

118 In one rural community on Karkar Island outreach programs were expansively conducted between
119 2013 and 2014 [16]. These programs successfully increased implant uptake on the island and
120 boosted contraceptive use by 12% [11,16]. However, despite 12 month follow up data indicating
121 high satisfaction rates amongst women who were using the implants, and 90% of women reporting
122 an intention to continue using such a method in the future, implant use on Karkar Island has fallen
123 by 30% since 2016 [11—13,16]. Interestingly, modern contraceptive prevalence rates on the island
124 did not fall by the same degree, suggesting women were using other modern methods instead of the
125 implant [11—13]. Service constraints and resource limitations may account for part of the observed

126 reduction in implant use, but given the complex socio-cultural setting of PNG, there is a need to
127 explore the ways in which the uptake of implants is influenced by these factors, including gender.

128 The societal structure of most communities in PNG is innately gendered [17]. Men play a key role in
129 family planning decision-making which stems from long-standing beliefs around the societal roles of
130 men, women and children [17]. Early data describes the nuclear family as the basic unit of society
131 which is typically organised around a 'big man' [17,18]. A 'big man' is prestigious within his
132 community; he is able to gather supporters around him, he functions as the head of the family and
133 he is the final arbiter of decisions [17,18]. Historically, and still in many parts of the country today,
134 the societal value of women lies in their capacity to produce and raise children for their husband's
135 clan and therefore the wealth they will attract for their paternal families in pigs and garden food that
136 would determine their 'bride price' at the time of marriage [17—19]. Marriage is therefore an
137 important pathway for men to gain prestige within their communities. Without marriage and
138 reproduction, for which they are dependent on women, their ambitions to become 'big men' is
139 severely curtailed [17—19].

140 Introduction of modern contraception into PNG in the 1980s to limit family size and delay
141 childbearing for other pursuits such as education, challenged these traditional paradigms and
142 dissociated both men and women from their cultural roots and heritage [17—20]. Men in particular
143 reported feeling incompetent because service providers failed to consult and involve them in the
144 development of reproductive health campaigns [20,21]. Combined with traditional perceptions that
145 menstrual blood, particularly after child-bearing, is considered 'dirty' and 'dangerous' with the
146 potential to cause 'weakness' in men, this resulted in an alternative social consensus emerging in
147 which exposure to and awareness of reproductive health became recognised as the preserve and
148 responsibility of women whilst men were better posited to attend to economic and financial matters
149 [17,20,21]. These social attitudes were found to persist in more recent studies from the highland
150 provinces of PNG in which men acknowledged the value of family planning, but they continued to

151 perceive it as ‘women’s business’ [22]. Importantly though, their perception did not disqualify these
152 men from being the final decision makers around the method of contraception used by their wives
153 [22].

154 In order to explore the issues of gendered relationships, community perceptions of family planning
155 and pathways to decision making around method use we undertook a qualitative study to
156 understand these issues in one rural setting in PNG: Karkar Island. So as to inform future program
157 planning we specifically investigate how community attitudes towards the contraceptive implant
158 reconcile with gendered relations within the decision-making process and how these may be
159 impacting on women and men’s decisions around implant use.

160 **Methods**

161 *Research setting*

162 Karkar Island is a rural community off the coast of Madang town, Madang Province on the north
163 coast of PNG, and is a two hour boat ride from the mainland. In 2016 the population was estimated
164 at 60,000 with 31,200 females (52%), of whom 51% were in the reproductive age range of 15—49
165 years [11,23]. Less than one in three (29%) of women of reproductive aged were using modern
166 contraceptives in 2016 [11,12]. Amongst those using a modern method, 40% were using implants,
167 31% were using injectables, 31% were using the oral contraceptive pill and the remainder were using
168 condoms, had had a tubal ligation or their husband had had a vasectomy. [11,12]. Implant uptake
169 amongst women on the island since 2016 has been minimal [23].

170 There are 52 villages on the island of which 41 (79%) are along the island’s 84km coastline [11,23].
171 Villages are connected by a continuous road which is subject to flooding. The island is serviced by
172 one district hospital, two major health centres and 23 peripheral aid posts which are all accessible by
173 road. The hospital and health centres are continuously staffed by nurses, midwives, doctors and

174 community health workers whilst staffing at aid posts is inconstant. Family planning counselling and
175 services should theoretically be available from all sites [23].

176 The socio-demographic make-up of Karkar Island is similar to other rural communities throughout
177 Papua New Guinea because there is a high proportion of reproductive aged women, an increasing
178 number of adolescents, a strong religious presence in the community, the majority of families rely
179 on subsistence income and population literacy rates are low [11,16]. However the unique
180 geography of the island means that women have greater access by road to the major health
181 facilities; because of this engagement with antenatal services and the number of supervised birth
182 rates on Karkar is between 15—30% higher than the rural national average [11]. The population of
183 Karkar Island is also relatively isolated from the mainland which minimizes the effect of shifting
184 populations on the location's health profile.

185 Each village on Karkar Island is headed by one or two leaders, a church representative and four to
186 five family elders, all of who are typically men [11,23]. Social ranking is determined by age, gender
187 and land asset with village heads responsible for maintaining order within and between villages,
188 including resolving family and marital disputes where necessary [11,12]. There is little in the way of
189 formal employment on Karkar Island with almost all men and women reliant on subsistence
190 agriculture or informal markets for their livelihoods [11,12].

191 *Study design, participants and recruitment*

192 The data used in this paper was drawn from a sub-set of a larger mixed methods study on the
193 impacts of contraceptive implants on maternal and neonatal health [16,23]. As part of the
194 qualitative study, focus group discussions (FGD) and in-depth interviews (IDI) with community
195 members and healthcare workers were used. The purpose of the qualitative sub-study was to
196 explore community attitudes towards the contraceptive implant and the pathways to decision
197 making around the use of the implant.

198 Twelve coastal and four inland villages were randomly selected for sampling using a computer-
 199 generated ballot. The research team liaised with the leaders in each village and together they invited
 200 participants to partake in FGDs. Snowball sampling was then used to invite men and women to
 201 partake in IDIs (Table 1). Key sampling characteristics for participants included age, exposure or
 202 non-exposure to implants, marital status, education and willingness to participate in discussion. We
 203 classified young people as those persons under 25 years of age according to the World Health
 204 Organisation definition [24]. We used a dyadic approach with the two couples who agreed to be
 205 interviewed separately and were aware that their accounts would be analysed alongside their
 206 partner's to directly compare the two perspectives within the same couple unit. Interviews for
 207 members of each couple unit were unable to be carried out simultaneously but were carried out
 208 successively without opportunity for them to convene and discuss with one another [25].

209 **Table 1: Focus-group discussion and in-depth interview participant groupings**

| Interview Type and Participants | Characteristics | Number of Interviews |
|--|-----------------------------|-----------------------------|
| Focus Group Discussions | | 10 |
| Men | Mixed age | 1 |
| | Age <25 | 1 |
| | Age >25 | 2 |
| Women | Mixed age | 1 |
| | Age <25 | 1 |
| | Age >25 | 2 |
| Men and Women | Mixed age | 2 |
| In-Depth Interviews | | 23 |
| Men | Partner implant user | 2 |
| | Partner implant former-user | 1 |
| | Partner implant never-user | 2 |
| Women | Implant user | 2 |
| | Implant former-user | 1 |
| | Implant never user | 2 |
| Village Leader | Coastal village | 3 |
| | Inland village | 1 |
| Health Worker | Nurse | 3 |
| | Village health volunteer | 1 |
| Religious Leader | Catholic | 3 |
| | Non-Catholic | 2 |

210

211 *Data Collection*

212 A semi-structured topic guide was used to guide the FGDs and explored the following areas: role of
213 family; family planning knowledge; family planning perceptions; experience with the implant;
214 decision making around implant use; and potential enablers and barriers towards implant use. Prior
215 to conducting the FGDs the topic guide was informed by formative work with the research team to
216 ensure its contextual suitability.

217 The development of the topic guides for IDIs was informed by iterative interim analysis of FGD data.
218 IDIs explored the decision-making processes around implant use and non-use in detail including: why
219 implants are used or not, who plays a role in the decision making process, who provides advice to
220 women, who provides advice to men, what actual experience of implant use has been, why women
221 stop or discontinue implant use and what personal and community attitudes are towards
222 unintended and teenage pregnancy.

223 All FGDs and IDIs were audio-recorded with participant consent and later transcribed and translated
224 from Tok Pisin to English by independent researchers. IDIs lasted an average of 55 minutes. Not
225 conversant in Tok Pisin, the lead author recruited a Papua New Guinean researcher trained in
226 qualitative research to conduct the IDIs and FGDs. The Papua New Guinean researcher was provided
227 training by the lead author on the research tool and the aim of the study. The lead author met with
228 all participants and thanked them for their involvement but was only present in the FGDs and only
229 participated in an ad-hoc manner in IDIs as the lead interviewer shared information in English. A
230 male health care worker known to the community supported the lead interviewer to ensure men
231 were comfortable being interviewed by a Papua New Guinean woman.

232 *Data Analysis*

233 Written transcripts were analysed using thematic analysis following the models described by
234 Neuman and Silverman [26,27] whereby transcripts were read and re-read in a process of

235 familiarisation. They were then open-coded using techniques outlined by Strauss and Corbin [28]. A
 236 coding framework was then developed and applied to the data. Analytical memos drawing on coded
 237 material supported the process of charting to cluster coded data into groups and categories to
 238 develop the main themes which described and characterised the primary findings from the
 239 transcripts. We used methods of triangulation to compare findings from within the same couple
 240 unit, across gender and age within the interview and FGD data and then cross-validated these
 241 findings with community leaders to enhance the richness of the data and to be able to account for
 242 variation in perspectives [29,30].

243 **RESULTS**

244 **Study Participants**

245 The characteristics of the 89 study participants are outlined in Table 2. The age range was from 17—
 246 52 years with a mean of 31 years. Fifty-seven percent of respondents were women. Of the male
 247 respondents, 41% were young men (<25 years). Almost two thirds of all respondents started
 248 primary school but three-quarters of this group did not complete Grade 7. Amongst young people, a
 249 larger proportion were educated to secondary level or higher (51%) than older people (18%).

250 **Table 2: Background characteristics of study participants (N=89)**

| 251 | Characteristic | Number | Percentage (%) |
|-----|------------------------|--------|----------------|
| 252 | <i>Gender</i> | | |
| 253 | Men | 38 | 43 |
| 254 | Women | 51 | 57 |
| 255 | | | |
| 256 | <i>Age</i> | | |
| 257 | <25 years | 32 | 36 |
| 258 | >25 years | 57 | 64 |
| 259 | | | |
| 260 | <i>Education</i> | | |
| 261 | None | 24 | 27 |
| 262 | Elementary and primary | 53 | 60 |
| 263 | Secondary or higher | 12 | 13 |
| 264 | | | |
| 265 | <i>Literacy</i> | | |
| 266 | No literacy | 64 | 72 |

| | | | |
|-----|-----------------------------|----|----|
| 267 | Literate | 25 | 28 |
| 268 | | | |
| 269 | <i>Occupation</i> | | |
| 270 | Subsistence farmer | 54 | 61 |
| 271 | Casual employee | 8 | 9 |
| 272 | Village leader | 9 | 10 |
| 273 | Church worker | 14 | 16 |
| 274 | Skilled worker | 4 | 4 |
| 275 | | | |
| 276 | <i>Religion</i> | | |
| 277 | Roman Catholic and Lutheran | 45 | 51 |
| 278 | United Church, Pentecostal | 40 | 45 |
| 279 | and Seventh Day Adventist | | |
| 280 | Other | 4 | 4 |
| 281 | | | |
| 282 | <i>Number of children</i> | | |
| 283 | Less than 3 | 38 | 43 |
| 284 | 3 or more | 51 | 57 |

285

286 **Community attitudes towards family planning and implant use**

287 The majority of participants, including religious and village leaders, acknowledged and understood
288 the need for family planning in order to limit family size as well as space a woman's pregnancies.
289 Land and housing shortages as well as financial issues on the island have very real consequences for
290 couple's decision making as well. Many couples interviewed spoke of only wanting up to three
291 children.

292 *'Three children is enough to help us with the land and look after us when we are old but it is*
293 *not too much for my husband to pay for their schooling and for their food and clothes. I am*
294 *also happy with three because I can love them equally.'* **Non-implant user, aged 26**

295 There was also a recognition by both women and men, including religious and village leaders, for a
296 woman to have adequate spacing between her pregnancies to ensure the health of the expectant
297 mother and by investing in this, the overall health of the unborn/newborn baby. With a healthy
298 mother and baby, the emotional and physical well-being of the whole family benefits.

299 *'It is important for mothers to have time to recover their health after birthing otherwise their*
300 *body becomes weak. If the mother is weak she cannot feed the child, she cannot look after*

301 *things in the house and she cannot care for her husband properly. All of these things are*
302 *important for the husband to be able to do his duties without worry.’* **Village leader and**
303 **husband of implant user, aged 32**

304 *‘I had two pregnancies close together and with the last one we had twins. This was very*
305 *difficult on my body. I had to send my eldest child to my sister’s village so she could care for*
306 *him while I tried to look after my babies. Sometimes when the babies were sick my husband*
307 *would have to stay home from work to help me so I could tend to the house; this made him*
308 *angry but we had no choice. It was very hard for us.’* **Non-implant user, aged 24**

309 There was an overriding preference amongst all respondents to use family planning methods which
310 they felt comfortable with and ‘trusted’. Trust was critical to a couple’s understanding and
311 acceptance of family planning methods and the contraceptive method chosen. Healthcare
312 information was ‘trusted’ if it could be corroborated through discussion with village peers.
313 Information about family planning, like other important health issues in Papua New Guinea, is
314 assembled by different types of information from a variety of sources. For example, in addition to
315 biomedical knowledge, other forms of knowledge are derived from cultural and religious domains.
316 Biomedical and social knowledge and information becomes more valid if these messages are seen to
317 be consistent. For women, healthcare information becomes socially validated through discussion
318 with other women, sisters, aunts, mothers and infrequently with church leaders. Whilst for men,
319 validity emerges through dialogues with friends, fellow workers, older family members, village elders
320 and religious leaders.

321 *‘I talked to my wife about family planning and her preferences. She did not like the pills*
322 *anymore and wanted to try the implant but she could not answer my questions about side*
323 *effects so I spoke with my cousin whose wife was using Depo and she was happy without*
324 *complaints. So that is why we went for the Depo. As the leader of the house I feel*
325 *responsible to make the right decisions for my family. If I do not have enough information I*

326 *do not feel like I can make a good decision so I have to find more information myself. I trust*
327 *the information from my family and elders.’ Husband of non-implant user, aged 27*

328 Most respondents reported familiarity with and therefore ‘trust’ in the combined oral contraceptive
329 pill, Depo Provera injections and condoms. Conversely, there was a strong undercurrent of fear and
330 apprehension towards the implant, or ‘rubber’ as it was locally called. Little was known about the
331 mechanism and side effects of the implant which ultimately lowered community confidence in the
332 device and prompted women to use alternative known and trusted methods.

333 *‘I am scared to let my wife use the rubber in case it makes her sick and then she will not be*
334 *able to do her duties in the house. Me and my family do not know enough about it. It is*
335 *better not to take a chance with things we do not know about.’ Husband of non-implant*
336 *user, aged 30*

337 Health-workers, particularly those with informal training, felt poorly positioned to alleviate
338 community concerns and questions about the implant either because they lacked the depth of
339 knowledge themselves, or if they do, they felt unable to compete with societal beliefs and concerns.

340 *‘Us health workers struggle to defend the implants at times. Men and women are scared to*
341 *use it because they do not know much about it and they do not trust it. Even if we show*
342 *them it is safe, they do not believe us because their friends and family convince them not to*
343 *use it.’ Female community health care worker, aged 29*

344 **Socio-cultural factors impacting upon implant awareness, acceptability and uptake**

345 **1. Intrinsic factors influencing the decision-making process**

346 Longstanding societal norms dictate that men have a stronger power of influence than women
347 within household decision-making, including those concerning reproductive healthcare. The process
348 of decision-making between man and woman in the couple unit is relational and is substantially
349 influenced by distinct external spheres which are infused with gendered characteristics. One sphere

350 contains village leaders, church leaders and other influential men: the direct audience for this sphere
351 is the man and owing to their power of influence within the decision-making process, this goes on to
352 represent the dominant sphere (see Figure 1). The other sphere consists of health care workers and
353 other village women: the direct audience for this sphere is the woman.

354 **Figure 1: Spheres of influences affecting men and women in reproductive healthcare decision-**
355 **making**

356 Women receive information about implants from health care workers during clinic visits and from
357 other women during their day-to-day interactions. Women then recall this to their partners. In turn
358 men reflect on the information remembered and shared by their wives before consulting other
359 members within their direct sphere of influence and coming to a final decision on whether his wife
360 should or should not have the implant. In this way women function as conduits of information but in
361 no way do they expect to be the sole decision-maker about implant use.

362 *'Us women are not allowed to make decisions that affect our body without consulting our*
363 *husbands and getting their approval, especially not for new methods like the implant. It does*
364 *not matter what the law says; this is our law and we abide to it because if we do not, there*
365 *will be disputes'* **Implant user, aged 39**

366 Importantly, the spheres were not observed by researchers to communicate with each other and the
367 health care worker who is expected to be the most knowledgeable about the implant and represents
368 the 'source of biomedical information' is not contained within the dominant sphere. This exclusion is
369 more likely to have a negative impact on implant uptake because general community knowledge of
370 the implant is low and health care worker knowledge becomes relatively uninfluential in dispelling
371 mis-information about the device within the dominant sphere. An emerging subset interaction
372 between young men and health care workers may balance transfer of biomedical information into
373 the dominant sphere and this exchange will be explored in more detail later.

374 2. Male perceptions of reproductive health

375 There is a deeply engrained perception that family planning is ‘women’s business’ and it is perceived
376 by men to be of less value than economic or financial concerns. Prioritisation of economic matters is
377 driven by a state of poverty in which men feel they would compromise their family’s wellbeing if
378 they were to redirect their attention towards reproductive healthcare matters. This explanatory
379 framework, which posited that men prioritised economic concerns, was generally cited as the
380 justification for their limited attendance at implant counselling sessions and their lack of motivation
381 to directly liaise with health care workers to learn more about the method.

382 *‘Family planning is women’s business. They are the ones to learn about it from their mothers*
383 *and sisters and the sisters in the clinic. My responsibility is to provide for my family by*
384 *tending to the land. It would take me away from the crops for one whole day to go to the*
385 *clinic and then wait for the health worker to discuss. We do not have the luxury of this in my*
386 *family.’ Husband of implant user, aged 28.*

387 *‘It is my priority to generate finances to feed and house my family. I do not have time to*
388 *attend such things as women’s business and family planning. It is not my interest.’ Husband*
389 **of non-implant user, aged 30**

390 More recently, some outreach campaigns have tried to include men in implant counselling [16,23].
391 Incorporating men into the interaction between women and health-workers essentially draws them
392 into an alternative sphere which they do not readily interact with (see Figure 1) and for some
393 participants this was described as uncomfortable and potentially emasculating. Consequently, there
394 is often an active resistance for men to interact with health workers, particularly female ones, out of
395 fear of social judgement.

396 *'In my community it is considered weak if a man is involved in women's business. I would*
397 *lose the respect of the other men in my village and this would upset me.'* **Husband of non-**
398 **implant user, aged 39**

399 There has been limited attention paid to bringing the health care worker into men's dominant
400 sphere of influence which in turn limits the transfer of biomedical reproductive healthcare
401 knowledge into this sphere. Information transfer is further restricted because most healthcare
402 workers are women and as such they are unable to approach men directly to enter their dominant
403 sphere of influence because it breaches the accepted gender norms of the community.

404 *'As a female health worker I cannot approach a male directly without his wife. It is*
405 *disrespectful; especially if I am wanting to talk about intimate topics like family planning.'*

406 **Midwife, aged 30**

407 Men though, especially those who lived in close proximity to the health centres, were more likely to
408 be receptive towards older male health workers and would more readily invite them to liaise with
409 social influencers including village and church leaders. The impact of this was diluted though by the
410 majority of male health workers being informally trained which limited their capacity to counsel
411 about implants.

412 *'I am an older male and well respected by my community. I learned about family planning from a*
413 *workshop run by the church and I was given permission to pass this knowledge onto the other*
414 *members of my community. I often speak with our village leader about the importance of*
415 *spacing pregnancy and he agrees with this. But I only know some things about pills and depo, not*
416 *much about the implant, so I cannot answer all of their questions.'* **Male village health**

417 **volunteer, aged 43**

418 **3. Women driven factors**

419 Biomedical information concerning the safety and side effects of implants is readily imparted
420 between healthcare workers and women because rapport and connection is enhanced by their
421 shared gender. Women then disperse these health messages through the community via
422 discussions with friends and family. Whilst this can be a rapid and effective pathway for information
423 transfer, these pathways also give rise to second and third hand information which can result in
424 rumours and mis-information about the implant; particularly amongst those women who have poor
425 literacy or live remote from the major health centres where access to health information is greatest.
426 Due to the intrinsic need for information to be corroborated with peers and family members, these
427 rumours have the potential to challenge the credibility of biomedical messages and impact on the
428 quality and accuracy of information which is eventually passed onto men. Amongst some women
429 residing remotely from health centres, rumours concerning the implant centred on the debilitating
430 side effects of the implants and the notion that implants have been introduced by foreigners to spy
431 on the locals. In a community where trust is paramount to the acceptance of information, these
432 rumours have been observed to fracture women's own receptivity towards using the device,
433 independent of their partner's impressions.

434 *'I trust what the health worker tells me about the implant because she is a good lady. But*
435 *my sisters and mother have heard stories from other women they know who say the implant*
436 *is not good and I cannot ignore their advice.'* **Implant non-user, aged 27**

437 *'My friend told me the implant has a camera inside which sends your information outside to*
438 *Moresby and other countries. When I heard this I went and had it taken out'* **Implant ex-user,**
439 **aged 34**

440 *'I have heard the implant makes your body weak. I know someone who used it and now she*
441 *cannot move her arm even after it was taken out. I do not want to use such a thing in my*
442 *body'* **Implant non-user, aged 29**

443 **Changing of the baton from old to young**

444 There were important differences in attitude and relational behaviour between young people and
445 older participants. Younger men were considerably more open to discuss implant use with their
446 partners and to engage with the health workers directly to seek out biomedical information (Figure
447 1). This is illustrated in the differences identified between the two couples whose interviews were
448 analysed using a dyadic approach. The woman from the older couple was comfortable to defer
449 family planning decisions to her partner. In contrast, the younger woman engaged her husband in a
450 discussion about the implant and invited him to liaise with a male health worker to gain more
451 information. This pattern was reflected across the data suggesting a changing social attitude
452 amongst younger participants.

453 *'Us young men are the next generation of our country. We cannot be ignorant to what is*
454 *happening around us like some of our fathers are. They are scared of knowledge but we are*
455 *not. We crave it. I do not know very much about family planning because it is not taught to*
456 *us in school but we can sometimes find information on the internet. If there is something we*
457 *do not understand then we can talk to the health workers about it and they usually help us.'*

458 **Man, aged 19**

459 Although there were some older married men who recognised the need for husbands to adopt a
460 more pro-active approach to seek out information and move towards informed decision making
461 around implant use, they were the exception. This tended to be driven by specific health and
462 economic circumstances in their family.

463 *'I was scared we would have another child close together and we would not be able to care*
464 *for them. This was my motivation to learn about family planning and the implant because I*
465 *had heard rumours it was very effective but did not know enough about it. Some of my*
466 *friends laughed at me but it was OK because I knew I could not afford more children so I did*
467 *not care for their views.'* **Husband of implant user, aged 36**

468 *'Sometimes I wish I had more courage to defend my wife's wishes. Her body was affected by*
469 *TB but in our culture it is very important to have a male child to inherit the land and the title.*
470 *We have three daughters so we need to keep trying for a male. This is why I am not allowing*
471 *her to use family planning.'* **Husband of non-implant user, aged 29**

472 Overall, while this changing pattern was acknowledged, many older men thought that it was a shift
473 that threatened the dominant order and ought to be resisted.

474 *'The young men of today are too confident. They do not care for our values and traditions.*
475 *Our elders have been guiding our families for generations. It is foolish to dismiss their advice*
476 *for the sake of something they read on the internet. There is a place for education and*
477 *information but not at the expense of our elder's knowledge.'* **Man, aged 28**

478 What emerged from this data was a 'transitional' model in which a new sphere of influence is
479 developing between young men and women that is more inclusive of health care worker knowledge.
480 This emerging relationship establishes a conduit through which biomedical information concerning
481 the implant can enter the dominant sphere of influence which then has the potential to lead to more
482 informed decision-making around implant use because young men are able to take first-hand
483 information from health workers into their discussions with community influencers.

484 **Discussion**

485 Our data illuminates a number of important themes and sub-themes which are intrinsically linked.
486 First, we identified that men on Karkar Island are keen to support their wives to use family planning
487 but there is a lack of community understanding into the contraceptive implant in particular which
488 drives men and women to opt against using the method. Second, though men perceive family
489 planning to be 'women's business', they remain strongly influential in the decision making processes
490 around which methods of family planning their wives eventually choose to use, and more
491 importantly, their investment in remaining influential in this process stems from long-standing

492 cultural expectations of men and women's societal roles. Third, there was a multifactorial dis-
493 interest among older men to increase their knowledge and awareness around contraceptive
494 implants but we discovered this attitude to be shifting amongst young men into one that was more
495 inclusive of and receptive to reproductive health information.

496 Community awareness and support for using contraception

497 Support for family planning interventions on Karkar Island is dichotomous in its ability to space
498 pregnancies and limit family size. Preserving women's health by enabling them to space their
499 pregnancies is viewed as an investment in the broader health and wellbeing of the family unit and
500 ultimately the community [17,18]. If a woman is healthy, she is better able to rear her children and
501 support her husband to become a 'big man' which eventually enhances the broader social hierarchy
502 [17—20]. Limiting family size to have three children means that couples can meet the socio-cultural
503 obligations for reproduction without putting unreasonable economic pressure on the family unit
504 [20]. Our data confirms that both women and men on Karkar Island clearly recognise the value of
505 modern contraception in achieving adequate pregnancy spacing and limiting family size but there
506 was a lack of acknowledgment for contraceptive implants to be the most preferred or effective
507 method.

508 Prior to the implant program Depoprovera ('Depo') was the most commonly used method of
509 contraception on the island [11]. While Depo has the advantage of less irregular bleeding, our
510 research shows that women were accepting of the irregular bleeding with implants and while 25%
511 had this side effect, only 2% of these women discontinued use for bothersome bleeding at 12
512 months [16]. This may be because the personal and social consequences of having an unintended
513 pregnancy are becoming more significant for women in PNG and despite cultural perceptions that
514 menstrual blood is 'dirty and dangerous', individuals and communities are beginning to re-shape
515 their perceptions around irregular bleeding in preference for effective and reliable contraception

516 [31,32]. The key advantage of the implants over Depo is that they are long lasting (reducing clinic
517 visits and supply chain issues) but quickly reversible [2].

518 Decision-making around contraception

519 According to the traditional social architecture of PNG and most other Melanesian societies, men
520 and women function as dividuals rather than individuals [33]. Dividuals are sociocentric as opposed
521 to individuals who are egocentric [33]. Decisions and actions of men and women within dividual
522 settings are therefore not autonomous but heteronomous as determined by their relationships with
523 each other in the couple unit and with their families and wider community [33]. Furthermore there
524 is a long standing and rigid role dichotomy between men and women in PNG which results in men
525 having a stronger seat of influence within the decision making process than women [17—20,33,34].
526 Christian missionisation throughout PNG brought new ideas concerning gender by focusing on the
527 nuclear family as the basic unit of society rather than the traditional extended family posited around
528 a ‘big man’, but in itself this new value system has not overridden traditional approaches to decision
529 making around family planning [17,20,33,34]. Findings from our data confirm that decision making
530 around family planning methods on Karkar Island remains heavily coloured by the various social
531 spheres of influence (Figure 1) and that deeply entrenched gendered perceptions allow men’s direct
532 sphere of influence to be more powerful than women’s within this process. Improving implant
533 uptake is therefore dependent on enhancing the receptiveness of the men’s direct sphere of
534 influence to accept information about the device [20,34].

535 The rigid role dichotomy between women and men contextualises why family planning awareness
536 and knowledge is perceived as ‘women’s business’ but does not entirely account for why community
537 awareness and acceptance of implants remains low. Biomedical information only represents part of
538 the source of information [34]. There is substantial scholarly work from PNG which details the
539 critical importance of religion in making sense of disease and treatment in culturally relevant ways
540 and the impact this has on community acceptance of health care interventions [35—37]. Christianity

541 is the dominant religion in PNG and churches are major providers of health and education services
542 but these organisations are not actively involved in expanding implant awareness on Karkar Island at
543 present; it remains the preserve of health centres and clinics [16,23,35].

544 Moreover it is likely that religion influences the work and practices of most healthcare workers, not
545 just those employed by faith-based organisations [35]. The church's inactivity in promoting implant
546 use on the island may be colouring the information being delivered about the implants by some
547 health care workers and contributing to the ongoing circulation of rumours. As suggested by studies
548 from other rural provinces in PNG, it could be more effective to expand community awareness and
549 acceptability of implants by engaging religious leaders as advocates for implant use [20—22,34].
550 This would directly engage the dominant sphere of influence whilst enabling healthcare messages
551 about the implant to be delivered via a conduit that the community recognise, respect and culturally
552 accept [20,34].

553 Men's general disengagement with biomedical health information can be explained by their
554 preference to value economically incentivised messages over health messages alone [20,22,34]. Men
555 in our focus groups stated economic disruption as the main reason for not engaging with health
556 services. Re-framing the benefits of limiting family size and spacing pregnancy in remunerative
557 rather than gendered terms may help to shift the discourse of men to engage with health care
558 messages [22]. Engaging village leaders, patriarchs and other male influencers to incentivise the
559 pecuniary value of contraception has shown promise in increasing method uptake amongst married
560 and unmarried couples in other low and middle income countries, most notably in rural India and
561 Nepal [6,38,39] and may be another strategy for engaging the dominant sphere of influence on
562 Karkar Island. Delivering biomedical health information via trained male health workers who can
563 liaise directly with men in their homes would also allow men to receive information without
564 distracting from their economic responsibilities [40,41]. Such schemes have improved spousal

565 communication and ultimately led to increased contraception uptake in sub-Saharan communities
566 [40—42].

567 The emerging attitude shift in the way young men and women engage with health information in our
568 study, which ultimately filters through to their decision making choices around implant use, is
569 inspired by a recent, global and rapid change in young person’s access to diverse external
570 information via the internet and social media [43,44]. Such altered exposure provoked the younger
571 men in our study to proactively seek out biomedical information from health workers to inform their
572 decisions and in doing so by-passed the more inflexible pathways that determine information access
573 and acceptability for their elders. By contrast, older men and women in the community remain
574 relatively isolated from modern sources of information because they reported a fear of criticism
575 from their peers if they were to access sexual and reproductive health resources via the internet or
576 mass media. This mirrors findings from other similarly conservative Polynesian and South Asian
577 communities where there is a tendency among older persons to remain sceptical of information
578 from external sources until it were accepted and trusted by community influencers [45].

579 International data confirms there is an evolving preference amongst young persons for implant use
580 due to their long action and user independent profiles [46,47] though these findings are yet to be
581 reported amongst young persons in PNG. Bell et al (2018) identified a lack of specific reproductive
582 health services for young persons in PNG as an important barrier in encouraging them to engage
583 with family planning on an ongoing basis. Youth specific services would be particularly beneficial to
584 protect young people from the aforementioned preconceptions of their adult peers and if included
585 in future programs, these services may help to enhance implant uptake among young people [48].

586 In isolation these interventions are unlikely to achieve significant shifts in the intractable gendered
587 dialogues that influence decision making around family planning on Karkar Island and similar
588 communities throughout PNG. Instead, enhancing education for young people is a broad and
589 powerful strategy for improving community health because it helps to foster positive health seeking

590 behaviours from a young age which then become trans-generational [49]. The Global Strategy for
591 Women's, Children's and Adolescents' Health (2016—2030) in line with the Sustainable
592 Development Goals 2030 Agenda are focusing on retaining adolescents in school and relying on the
593 associated improvements in literacy to enhance their understanding of contraceptive benefits
594 [49,50].

595 ***Limitations***

596 This study analyses decision making dynamics amongst a single community in response to a
597 retrospectively introduced intervention and our observations may not be transferrable to other
598 populations without further research. A major pre-requisite for men and women to develop greater
599 interest in biomedical information about implants rests on the assumption that current perspectives
600 amongst young people remain unchanged and do not become indoctrinated by changing social roles
601 over time. Using dyad interview techniques provided richness to our analysis around shared decision
602 making but our ability to represent the data using direct quotes was challenged by the well
603 described ethical constraints of exposing participant identity [51]. Importantly our study findings are
604 based on participant recounts rather than observed behaviours and we should be circumspect in
605 interpreting these findings and extrapolating their longitudinal impact.

606 ***Conclusions***

607 In communities, such as on Karkar island, where a couple's decision to use the contraceptive implant
608 is strongly coloured by gendered roles and social perceptions, having a detailed understanding of the
609 relational dynamics affecting the decision-making unit is useful in targeting future healthcare
610 interventions. In the short to mid-term recruiting respected community members such as religious
611 and village leaders to be health messengers, and reframing the benefits of implants in economic
612 terms will likely have a catalytic effect on engaging older men with reproductive health services,
613 which may ultimately encourage method uptake. Simultaneously, if health strategists cultivate the
614 pro-active information seeking attitudes evolving amongst young persons by developing specific

615 reproductive health services for them, this will pave the way for the new ethos of shared and
616 informed decision making to emerge as a longer term solution to increasing implant uptake.

617 **List of Abbreviations**

618 PNG Papua New Guinea

619 LMIC Low and Middle Income Countries

620 FGD Focus Group Discussions

621 IDI In Depth Interviews

622 **Declarations**

623 Ethical approval

624 Ethical approval was sought from the Papua New Guinea National Department of Health's Medical
625 Research Advisory Committee (MRAC number 17.08) and the Papua New Guinea Institute of Medical
626 Research's Institutional Review Board (IMR IRB number 1703).

627 Consent for publication

628 All respondents provided verbal consent for their responses to be recorded and published prior to
629 participation in the in-depth interviews and focus group discussions. Verbal consent from each
630 participant has been recorded at the start of each interview or discussion.

631 Availability of data and materials

632 Data sharing is not applicable to this article as no datasets were generated or analysed during the
633 current study. All interview and focus group discussion manuscripts are available from the
634 corresponding author in raw and coded form on reasonable request.

635 Competing interests

636 There are no competing interests to declare.

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640 Author Contribution

641 All authors were equally involved in the development of the study aims and methodology. SG, SB
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643 manuscript.

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