```
/*******************************************************************************

            Desire Habonimana
            Data analysis (PROVIDER QRE)- DPhil analyses
            Oxford, February 2023

*******************************************************************************/

* Working directory
cd "/Users/desire/Documents/ToS application/DPhil analysis/2. provider"

* Importing dataset "provider dataset"
import excel "/Users/desire/Desktop/DPhil analyses/2. provider/Prestataire.xlsx", sheet("Feuil1")
firstrow
br
/* 308 variables and 311 observations
Most variables are string */

save datasetPROVIDER.dta, replace

/*******************************************************************************

                        Dataset exploration and cleaning

*******************************************************************************/

ssc install fre
use datasetPROVIDER, clear

**# *1. Health Facility identification

foreach v of var Province DS FOSA Typedelétablissementdes{
    cap drop n_`v'
    encode `v', gen(n_`v')
```

```
}
cap drop province district facility faci_type
rename (n_Province n_DS n_FOSA n_Typedelétablissementdes) (province district facility faci_type)

**# *2. Provider identification

br Sexedurepondant Quelâgeastuenannées Quelleestvotrequalificationp Combiendannéesdexpérienc Combiendetempstravaillez Combiendaccouchementspar Combiendecésariennesavez Avezvousdéjàsuiviunefor Siouilequeldeséléments
foreach v of var Combiendaccouchementspar Combiendecésariennesavez{
    cap drop `v'_new
    destring `v', gen(`v'_new) force
}
foreach v of var Sexedurepondant Quelleestvotrequalificationp Combiendetempstravaillez Avezvousdéjàsuiviunefor Siouilequeldeséléments{
    cap drop `v'_new
    encode `v', gen(`v'_new)
}
cap drop age experience number_deliveries number_csections sex qualification type_employment EmONC_training whichtraining
rename (Quelâgeastuenannées Combiendannéesdexpérienc Combiendaccouchementspar_new Combiendecésariennesavez_new Sexedurepondant_new Quelleestvotrequalificationp_new Combiendetempstravaillez_new Avezvousdéjàsuiviunefor_new Siouilequeldeséléments_new) (age experience number_deliveries number_csections sex qualification type_employment EmONC_training whichtraining)

cap drop whichward
encode Danslequeldecesservicestrav, gen(whichward)
br age experience number_deliveries number_csections sex qualification type_employment EmONC_training whichtraining whichward

**# *3. Provider clinical confidence to manage complications

* experience in the management of obstetric and newborn complications
```

```
59  global list1 Avezvousgéréunepréécl Avezvousprisenchargeun Avezvousgéréuntravail
    Avezvousréussiàaccouche Avezvouspratiquélaréan Avezvousgérélepaludism Avezvousgérélhypertensi
60  foreach v of var $list1{
61      cap drop `v'_n
62      encode `v', gen(`v'_n)
63  }
64  cap drop pre_eclampsia pphemorrhage obstructed_prolonged breech_deliveries newbresuscitation
    malaria_mngt hypertension
65  rename (Avezvousgéréunepréécl_n Avezvousprisenchargeun_n Avezvousgéréuntravail_n
    Avezvousréussiàaccouche_n Avezvouspratiquélaréan_n Avezvousgérélepaludism_n
    Avezvousgérélhypertensi_n) (pre_eclampsia pphemorrhage obstructed_prolonged breech_deliveries
    newbresuscitation malaria_mngt hypertension)
66
67  br pre_eclampsia pphemorrhage obstructed_prolonged breech_deliveries newbresuscitation
    malaria_mngt hypertension
68
69  * the number of cases of obstetric and newborn complications managed in 12 months
70  global list2 Enmoyennecombiendecas BM Combiencombiendecasde BS Enmoyennecombienderéa BY CB
71  foreach v of var $list2{
72      cap drop `v'_n
73      destring `v', gen(`v'_n) force
74  }
75  cap drop npre_eclampsia npphemorrhage nobstructed_prolonged nbreech_deliveries nnewbresuscitation
    nmalaria_mngt nhypertension
76  rename (Enmoyennecombiendecas_n BM_n Combiencombiendecasde_n BS_n Enmoyennecombienderéa_n BY_n
    CB_n) (npre_eclampsia npphemorrhage nobstructed_prolonged nbreech_deliveries nnewbresuscitation
    nmalaria_mngt nhypertension)
77
78  br npre_eclampsia npphemorrhage nobstructed_prolonged nbreech_deliveries nnewbresuscitation
    nmalaria_mngt nhypertension
79
80  * self-reported confidence to manage obstetric and newborn complications
81  global list3 Veuillezindiquervotreniv Veuillezindiquervotreni BQ BT BW BZ CC
82  foreach v of var $list3{
```

```
    cap drop `v'_n
    encode `v', gen(`v'_n)
}
cap drop confipre_eclampsia confipphemorrhage confiobstructed_prolonged confibreech_deliveries confinewbresuscitation confimalaria_mngt confihypertension
rename (Veuillezindiquervotreniv_n Veuillezindiquervotreni_n BQ_n BT_n BW_n BZ_n CC_n) (confipre_eclampsia confipphemorrhage confiobstructed_prolonged confibreech_deliveries confinewbresuscitation confimalaria_mngt confihypertension)

br confipre_eclampsia confipphemorrhage confiobstructed_prolonged confibreech_deliveries confinewbresuscitation confimalaria_mngt confihypertension

**# *4. Clinical skills assessment

**# 4.1. LABOUR MONITORING
* What do you check when woman is admitted in maternity (as per the guideline)?
cap drop BCF cranefoetal dilatation head contractions bpmonitoring respirationmother temperaturemother pulsemother urinemother
rename (CM CN CO CP CQ CR CS CT CU CV) (BCF cranefoetal dilatation head contractions bpmonitoring respirationmother temperaturemother pulsemother urinemother)
* Active phase management
cap drop oxytocin controlledcordpull uterinemassage examinationplacenta examinationvagina
rename (FJ FK FL FM FN) (oxytocin controlledcordpull uterinemassage examinationplacenta examinationvagina)

**# 4.2. INFECTIONS PREVENTION
* What do you do to prevent infection(s) (as per practical guideline)
cap drop weargownetc washplusantiseptic sterilegloves washperinea steriledrapes
rename (DA DB DC DD DE) (weargownetc washplusantiseptic sterilegloves washperinea steriledrapes)

**# 4.3. MALARIA MANAGEMENT
* What are danger signs to check in case of suspicion of severe malaria if pregnant?
cap drop feverabove38 confusioncoma paleness jaundice foetalhealth dizziness bonejointpain dehydration
```

```
109 rename (DI DJ DK DL DM DN DO DP) (feverabove38 confusioncoma paleness jaundice foetalhealth
    dizziness bonejointpain dehydration)
110 * When a woman comes for ANC and presents signs of severe malaria, what do you do?
111 cap drop vitalsignspair admitnow quinedextroseIV bloodsample hbnchecked
112 rename (DU DV DW DX DY) (vitalsignspair admitnow quinedextroseIV bloodsample hbnchecked)
113
114 **# 4.4. MANAGEMENT OF POST-PARTUM HEMORRHAGE
115 * What signs do you check if hemorrhage in postpartum?
116 cap drop uncontracteduterus chocksigns bleedingsize retention fullbladder birthcanallesions
    anemiasigns
117 rename (EI EJ EK EL EM EN EO) (uncontracteduterus chocksigns bleedingsize retention fullbladder
    birthcanallesions anemiasigns)
118 * What do you do (in practice) if important hemorrhage in postpartum?
119 cap drop fundusmassage emptybladder ergometry intravenousfluids bloodsamplehbn dechirures
    manualextraction seeDrSpecialist trendelenburg
120 rename (ES ET EU EV EW EX EY EZ FA) (fundusmassage emptybladder ergometry intravenousfluids
    bloodsamplehbn dechirures manualextraction seeDrSpecialist trendelenburg)
121 * What do you do if placenta is retained?
122 cap drop emptybladder1 tractioncord repeatoxytocin manualremovalplac IVfluids vitalsigns1
    contracteduterus bloodtype prepareforoperation referDrSpecialist
123 rename (FR FS FT FU FV FW FX FY FZ GA) (emptybladder1 tractioncord repeatoxytocin
    manualremovalplac IVfluids vitalsigns1 contracteduterus bloodtype prepareforoperation
    referDrSpecialist)
124 * If woman has general malaise 48 hours after delivery, what signs do you check?
125 cap drop highpulse highfever septicshock tenderuterus badsmellinglochia sensitiveabdomen
126 rename (GF GG GH GI GJ GK) (highpulse highfever septicshock tenderuterus badsmellinglochia
    sensitiveabdomen)
127 * If woman has complications resulting from an incomplete or unsafe abortion, what do you do?
128 cap drop bloodflow vitalsigns2 IVfluids1 antibiotics1 performMVA vaginalexam dilationcurettage
    counseling referDrSpecialist1
129 rename (GN GO GP GQ GR GS GT GU GV) (bloodflow vitalsigns2 IVfluids1 antibiotics1 performMVA
    vaginalexam dilationcurettage counseling referDrSpecialist1)
130
131 **# 4.5. MANAGEMENT OF PRE-ECLAMPSIA OR ECLAMPSIA
```

```
cap drop pregnancyterm temperatureBP paincharacterization visualblurring
rename (HA HB HC HD) (pregnancyterm temperatureBP paincharacterization visualblurring)
* You suspect severe preeclampsia, main positive signs to check and monitor?
cap drop diastolehigh intenseheadache visualblur epigatricpain proteinuria
rename (HH HI HJ HK HL) (diastolehigh intenseheadache visualblur epigatricpain proteinuria)
* CONFIRMED severe preeclampsia, what do you do?
cap drop admit informsiblings sulphatemgn continuesulfate maintenancedose sulfate24afterdelivery
rename (HQ HR HS HT HU HV) (admit informsiblings sulphatemgn continuesulfate maintenancedose
sulfate24afterdelivery)
* Before administering the maintenance dose of magnesium sulphate, special precautions should be
* observed. Which ones?
cap drop respiratoryrate patellarreflexes diuresis
rename (IA IB IC) (respiratoryrate patellarreflexes diuresis)
* In the event of cardiac arrest linked to the administration of magnesium sulphate, what should
cap drop assistedventilation calciumgluconate
rename (IG IH) (assistedventilation calciumgluconate)
* What are the main monitoring elements in the management of severe preeclampsia?
cap drop infusionofsolutes monitoroverloads signsofOAP diuresisproteinuria hourlyvsrefBCF
coagulation
rename (IL IM IN IO IP IQ) (infusionofsolutes monitoroverloads signsofOAP diuresisproteinuria
hourlyvsrefBCF coagulation)

**# 4.6. NEWBORN CARE
* What are the immediate care elements of the newborn?
cap drop wipe cordcare breathcheck thermalprotection breastfeeding1h newbornexam1h weighbaby
ocularprophylaxis
rename (IV IW IX IY IZ JA JB JC) (wipe cordcare breathcheck thermalprotection breastfeeding1h
newbornexam1h weighbaby ocularprophylaxis)
* If a newborn baby does not breathe at birth, what do you do?
cap drop clearairways drywrapbaby heatsource ambubag cardiacmassage suctionifmeconium
rename (JG JH JI JJ JK JL) (clearairways drywrapbaby heatsource ambubag cardiacmassage
suctionifmeconium)
* What do you do (PMTCT) during labour?
cap drop nevirapinifVIHp checkHIVstatusifUnknown nevirapinbabyifHIVp
```

```
160 rename (ED EE EF) (nevirapinifVIHp checkHIVstatusifUnknown nevirapinbabyifHIVp)
161
162 save "datasetPROVIDER.dta", replace
163
164 /*******************************************************************************
165
166                                     Data analyses
167
168 *******************************************************************************/
169
170 **# Descriptive statistics of professionals
171 *facility
172 tab faci_type // 159 CDS 120 DistrictHosp 17 RegionalHosp 15 NationalHosp
173 cap drop type_faci
174 gen type_faci=.
175 replace type_faci = 1 if faci_type==1 // BEmONC
176 replace type_faci = 2 if faci_type!=1 // CEmONC
177 label drop facili
178 label define facili 1 "BEmONC" 2 "CEmONC"
179 label val type_faci facili
180 tab type_faci // 159 BEmONC and 152 CEmONC
181 *sex
182 tab sex
183 bysort type_faci: tab sex // BEmONC vs CEmONC
184 bysort faci_type: tab sex // Inside CEmONC only
185 *qualification
186 tab qualification // 14 MD 40 midwives 257 nurses
187 dis 38+3+99+117
188 cap drop qualification1
189 gen qualification1=.
190 replace qualification1=1 if qualification==2 // medical doctors
191 replace qualification1=2 if qualification==3 // midwives
192 replace qualification1=3 if qualification1==. // nurses
193 label drop qual
```

```
label define qual 1 "Doctors" 2 "Midwives" 3 "Nurses"
label values qualification1 qual
tab qualification1
bysort type_faci: tab qualification1 // BEmONC vs CEmONC
bysort faci_type: tab qualification1 // Inside CEmONC only
*employment type
tab type_employment // 297 full-time 14 part-time staff
bysort type_faci: tab type_employment // BEmONC vs CEmONC
bysort faci_type: tab type_employment // Inside CEmONC only
*EmONC training history
tab EmONC_training
bysort type_faci: tab EmONC_training // BEmONC vs CEmONC
bysort faci_type: tab EmONC_training // Inside CEmONC only
*age
sum age // 37.565 [22 - 70]
cap drop agecat
gen agecat=.
replace agecat=1 if age>=22 & age<=35
replace agecat=2 if age>=36 & age<=50
replace agecat=3 if age>=51
tab agecat // note details esp those nearing retirement
label drop ages
label define ages 1 "22-35 years" 2 "36-50 years" 3 "older than 50 years"
label values agecat ages
tab agecat
bysort type_faci: tab agecat // BEmONC vs CEmONC
bysort faci_type: tab agecat // Inside CEmONC only
*number of years of experience
tab experience // oldest experience is 36 years
sum experience // between 0.11 and 36 years of experience
hist experience, norm
cap drop experience1
gen experience1=.
replace experience1=1 if experience<2 // have experience of <1 year
```

```
228 replace experience1=2 if experience>=2 & experience<5 // 1-5 years
229 replace experience1=3 if experience>=5 & experience<10 // 6-10 years
230 replace experience1=4 if experience>=10 // More than 10 years
231 label drop exper
232 label define exper 1 "< 2 year" 2 "2 to < 5 years" 3 "5 to < 10 years" 4 "More than 10 years"
233 label values experience1 exper
234 tab experience1
235 bysort type_faci: tab experience1 // BEmONC vs CEmONC
236 bysort faci_type: tab experience1 // Inside CEmONC only
237 * number of deliveries
238 tab number_deliveries
239 cap drop deliveryexp
240 gen deliveryexp=.
241 replace deliveryexp=0 if number_deliveries==0 // zero deliveries
242 replace deliveryexp=1 if number_deliveries>=1 & number_deliveries<=10 // 1 to 10 deliveries
243 replace deliveryexp=2 if number_deliveries>=11 & number_deliveries<=20 // 11 to 20 women
    deliveries
244 replace deliveryexp=3 if number_deliveries>=21 & number_deliveries<=50 // 21 to 50 women deliveries
245 replace deliveryexp=4 if number_deliveries>=51 // more than 50 deliveries
246 label drop deliv
247 label define deliv 0 "Zero deliveries" 1 "1-10 deliveries" 2 "11-20 deliveries" 3 "21-50
    deliveries" 4 "> 50 deliveries"
248 label values deliveryexp deliv
249 tab deliveryexp
250 bysort type_faci: tab deliveryexp // BEmONC vs CEmONC
251 bysort faci_type: tab deliveryexp // Inside CEmONC only
252 *number of c-sections
253 bysort qualification1: tab number_csections, m // Only medical doctors do c-section and they are
    14 ONLY (not enough sample size)
254
255 **# EmONC competency elevuation based on complication management in 12 months pre-survey
256 *experience in managing obstetric and newborn complications
257 global varlist1 pre_eclampsia pphemorrhage obstructed_prolonged breech_deliveries malaria_mngt
    hypertension newbresuscitation
```

```
259     bysort type_faci: tab `v'
260 }
261
262 foreach v of var $varlist1{
263     bysort qualification1: tab `v'
264 }
265
266 bysort qualification1: tab pre_eclampsia
267 bysort qualification1: tab pphemorrhage
268 bysort qualification1: tab obstructed_prolonged
269 bysort qualification1: tab breech_deliveries
270 bysort qualification1: tab malaria_mngt
271 bysort qualification1: tab hypertension
272 bysort qualification1: tab newbresuscitation
273
274 *overall experience in managing complications
275 cap drop newall
276 gen newall=.
277 codebook $varlist1 // 1 means not managed the complication, 2 otherwise
278 replace newall = 2 if pre_eclampsia==2 & pphemorrhage==2 & obstructed_prolonged==2 &
    breech_deliveries==2 & malaria_mngt==2 & hypertension==2 & newbresuscitation==2
279 replace newall = 1 if newall==.
280 tab newall
281 label drop newv
282 label define newv 1 "No" 2 "Yes"
283 label values newall newv
284 tab newall
285
286 bysort type_faci: tab newall
287 bysort qualification1: tab newall
288
289 *mean cases of obstetric and newborn complications that providers have managed in previous 3
    months
290 global varlist2 npre_eclampsia npphemorrhage nobstructed_prolonged nbreech_deliveries
```

```
bysort type_faci: sum npre_eclampsia if pre_eclampsia==2, d
bysort type_faci: sum npphemorrhage if pphemorrhage==2, d
bysort type_faci: sum nobstructed_prolonged if obstructed_prolonged==2, d
bysort type_faci: sum nbreech_deliveries if breech_deliveries==2, d
bysort type_faci: sum nmalaria_mngt if malaria_mngt==2, d
bysort type_faci: sum nhypertension if hypertension==2, d
bysort type_faci: sum nnewbresuscitation if newbresuscitation==2, d

**# *Self-reported confidence to manage obstetric and newborn complications
global varlist3 confipre_eclampsia confipphemorrhage confiobstructed_prolonged confibreech_deliveries confinewbresuscitation confimalaria_mngt confihypertension
codebook $varlist3
foreach v of var confipre_eclampsia confiobstructed_prolonged confibreech_deliveries confinewbresuscitation confimalaria_mngt confihypertension{
    cap drop `v'_n
    gen `v'_n=.
    replace `v'_n = 1 if `v' == 1 | `v' == 2
    replace `v'_n = 2 if `v' == 3
    replace `v'_n = 3 if `v' == 4
}
cap drop confipphemorrhage_n
gen confipphemorrhage_n=.
replace confipphemorrhage_n = 1 if confipphemorrhage == 2 | confipphemorrhage == 3
replace confipphemorrhage_n = 2 if confipphemorrhage == 1
replace confipphemorrhage_n = 3 if confipphemorrhage == 4

global varlist4 confipre_eclampsia_n confipphemorrhage_n confiobstructed_prolonged_n confibreech_deliveries_n confinewbresuscitation_n confimalaria_mngt_n confihypertension_n
br $varlist4
codebook $varlist4
foreach v of var $varlist4{
    label drop variablelabel
    label define variablelabel 1 "Not confident at all" 2 "Somewhat confident" 3 "Very confident"
    label values `v' variablelabel
```

```
}
br confipre_eclampsia_n confipphemorrhage_n confiobstructed_prolonged_n confibreech_deliveries_n confinewbresuscitation_n confimalaria_mngt_n confihypertension_n

cap drop allconfidence
gen allconfidence=.
foreach v of var $varlist4{
    replace allconfidence = 1 if `v'==1
    replace allconfidence = 2 if `v'==2
    replace allconfidence = 3 if `v'==3
}
label drop allconflabel
label define allconflabel 1 "Not confident at all" 2 "Somewhat confident" 3 "Very confident"
label values allconfidence allconflabel
tab allconfidence

**# *Factor analysis
codebook confipre_eclampsia_n confipphemorrhage_n confiobstructed_prolonged_n confibreech_deliveries_n confinewbresuscitation_n confimalaria_mngt_n confihypertension_n, compact
pwcorr confipre_eclampsia_n confipphemorrhage_n confiobstructed_prolonged_n confibreech_deliveries_n confinewbresuscitation_n confimalaria_mngt_n confihypertension_n
factor confipre_eclampsia_n confipphemorrhage_n confiobstructed_prolonged_n confibreech_deliveries_n confinewbresuscitation_n confimalaria_mngt_n confihypertension_n, pcf // Factor 1 has an eigenvalue of 4 which is 57% of the possible 7 and all the 7 items have a great loading (at least 0.57) above the threshold of 0.40
screeplot // One (the first) factor is very dominant
* Comment: One factor (the first) is very dominant as the single principal component, and all items loaded strongly on it. Plus, since loadings do not vary a great deal (there is no much variation), we can either use a factor score or generate a mean as these two methods won't generate substential differences in the results
cap drop confidence
predict confidence, norotate

codebook confipre_eclampsia_n confipphemorrhage_n confiobstructed_prolonged_n
```

```
    confibreech_deliveries_n confinewbresuscitation_n confimalaria_mngt_n confihypertension_n
347 global varlist confipre_eclampsia_n confipphemorrhage_n confiobstructed_prolonged_n
    confibreech_deliveries_n confinewbresuscitation_n confimalaria_mngt_n confihypertension_n
348 fre $varlist
349
350 foreach v of var $varlist{
351     recode `v'(1=0) (2=1) (3=2), gen(`v'_n)
352 }
353 cap drop condifencemean
354 egen condifencemean = rowmean(confipre_eclampsia_n_n confipphemorrhage_n_n
    confiobstructed_prolonged_n_n confibreech_deliveries_n_n confinewbresuscitation_n_n
    confimalaria_mngt_n_n confihypertension_n_n)
355 sum condifencemean // overall confidence
356 histogram condifencemean, percent
357
358 cap drop finalconfidence
359 gen finalconfidence = condifencemean*50
360 hist finalconfidence, norm
361
362 *normality of index checks
363 sum finalconfidence, d // Skewness is negative (instead of zero) no negatively skewed but
    Kurtosis is ok (<3)
364 sktest finalconfidence
365 graph hbox finalconfidence, over(sex)
366 graph hbox finalconfidence, over(qualification1)
367 hist finalconfidence if qualification1==1, norm
368 hist finalconfidence if qualification1==2, norm
369 hist finalconfidence if qualification1==3, norm
370 sktest finalconfidence if qualification1==1 // skewed
371 sktest finalconfidence if qualification1==2 // skewed
372 sktest finalconfidence if qualification1==3 // skewed
373
374 *descriptive statistics of confidence to manage EmONC
375 bysort sex: sum finalconfidence, d // confidence by gender
```

```
ttest finalconfidence, by(sex)
bysort agecat: sum finalconfidence // confidence by age category
mvtest means finalconfidence, by(agecat) // mvtest means – Multivariate tests of means
bysort qualification1: sum finalconfidence // confidence by qualification
mvtest means finalconfidence, by(qualification1)
bysort type_faci: sum finalconfidence // confidence by facility type
ttest finalconfidence, by(type_faci)
bysort EmONC_training: sum finalconfidence // confidence by EmONC training
ttest finalconfidence, by(EmONC_training)
*bysort type_employment: sum condifencemean // confidence by type of employment
ttest finalconfidence, by(sex)
bysort experience1: sum finalconfidence // confidence by years of work experience
ttest finalconfidence, by(sex)
bysort deliveryexp: sum finalconfidence // confidence by delivery experience
mvtest means finalconfidence, by(deliveryexp)

tabstat finalconfidence, s(n p25 p50 p75 iqr)
tabstat finalconfidence, by(sex) s(n p25 p50 p75 iqr)
ttest finalconfidence, by(sex)
tabstat finalconfidence, by(agecat) s(n p25 p50 p75 iqr)
mvtest means finalconfidence, by(agecat) // mvtest means – Multivariate tests of equality of means
manova finalconfidence = agecat // same results as mvtest means (Ho = means are equal, reject if
a < 0.05)
tabstat finalconfidence, by(qualification1) s(n p25 p50 p75 iqr)
mvtest means finalconfidence, by(qualification1)
tabstat finalconfidence, by(type_faci) s(n p25 p50 p75 iqr)
mvtest means finalconfidence, by(type_faci)
tabstat finalconfidence, by(EmONC_training) s(n p25 p50 p75 iqr)
mvtest means finalconfidence, by(EmONC_training)
tabstat finalconfidence, by(EmONC_training) s(n p25 p50 p75 iqr)
mvtest means finalconfidence, by(EmONC_training)
tabstat finalconfidence, by(deliveryexp) s(n p25 p50 p75 iqr)
mvtest means finalconfidence, by(deliveryexp)

```

```
*fitting a regressions
cap drop condifencemean1
egen condifencemean1 = rowmean(confipre_eclampsia_n confipphemorrhage_n confiobstructed_prolonged_n confibreech_deliveries_n confinewbresuscitation_n confimalaria_mngt_n confihypertension_n)
sum condifencemean1
*examine the variables in the model to check for possible errors
pwcorr faci_type sex qualification1 EmONC_training agecat experience1 deliveryexp, star(0.05) sig
// Corr matrix of regressors
graph matrix faci_type sex qualification1 EmONC_training agecat experience1 deliveryexp, half
*examining the dependent variable
sum condifencemean1, d
// Skewness = -.4824842 means that the variable is skewed to the left and Kurtosis = 2.307144 means that the trails are too thick (see page 283 stata book "a gentle intro to stata, sixth edited version)
histogram condifencemean1, normal kdensity
ssc install hangroot
hangroot condifencemean1, bar
sktest condifencemean1 // test of skewness shows that skewness=-0.48, p = 0.0007 and kurtosis=2.30, p=0.0002 hence the outcome variable is not normally distributed
*examining predictors
describe condifencemean1 faci_type sex qualification1 EmONC_training agecat experience1 deliveryexp
summarize condifencemean1 faci_type sex qualification1 EmONC_training agecat experience1 deliveryexp
*fitting a regression
regress condifencemean1 i.faci_type i.sex ib3.qualification1 i.EmONC_training i.agecat i.experience1 i.deliveryexp, beta
*regress condifencemean i.faci_type i.sex ib3.qualification1 i.EmONC_training age experience number_deliveries, beta
*examining residuals (regresion assumes normality of residuals)
predict res, residuals
sum res, d
sktest res // residuals are not normally distributed and this assumption is important NOT TO VIOLATE. But, n=311 is a relatively big sample to ignore skewness of residuals (minimum n=100)
```

```
    experience1 i.deliveryexp, vce(robust)
435 *diagnising the regression model
436 *1. outliers
437 help regress postestimation
438 regress condifencemean1 i.faci_type i.sex ib3.qualification1 i.EmONC_training i.agecat i.
    experience1 i.deliveryexp, beta
439 predict yhat // estimated score based on the regression
440 predict residual, residuals // residuals
441 predict rstandard, rstandard // standardised residuals
442 list faci_type condifencemean1 yhat residual rstandard if abs(rstandard) > 2.58 & !missing(
    rstandard)
443 *2. Influential observations
444 regress condifencemean1 i.faci_type i.sex ib3.qualification1 i.EmONC_training i.agecat i.
    experience1 i.deliveryexp, beta
445 dfbeta
446 *3. Multicollineality checks - variance inflation factor
447 regress condifencemean1 i.faci_type i.sex ib3.qualification1 i.EmONC_training age
    number_deliveries, beta
448 estat vif // variance inflation factor. There is no multicollineality among predictors (rule of
    thumb VIF < 10) which is < 1.4 across all predictors. However, this was obtained after removing
    the "number of years of work experience" as this was highly correlated with the number of
    deliveries with an overall mean VIF of > 4. After removing the correlated predictor, the mean VIF
    dropped to 1.17 which is a great score of non-collineality
449
450 ** FINAL robust regression models
451 regress condifencemean1 i.faci_type i.sex ib3.qualification1 i.EmONC_training age
    number_deliveries, beta
452 regress condifencemean1 i.faci_type i.sex ib3.qualification1 i.EmONC_training age
    number_deliveries, vce(robust)
453
454 **# *Objective clinical skills assessment
455
456 **# *1.Labour monitoring (2 questions)
457
```

```
458 * nomnal labour monitoring
459 cap drop labourmonitoring
460 gen labourmonitoring=.
461 foreach v of var BCF cranefoetal dilatation head contractions bpmonitoring respirationmother
    temperaturemother pulsemother urinemother{
462     replace labourmonitoring=1 if `v'==1
463     replace labourmonitoring=0 if `v'==0
464 }
465 tab labourmonitoring // 55 good responses to a set of 10 signs to monitor against 256 wrong or
    partial responses
466
467 alpha BCF cranefoetal dilatation head contractions bpmonitoring respirationmother
    temperaturemother pulsemother urinemother, std item label // correlation, validity and
    reliability of items
468 cap drop labourscor
469 egen labourscor = rowmean(BCF cranefoetal dilatation head contractions bpmonitoring
    respirationmother temperaturemother pulsemother urinemother) // mean score index
470 cap drop labourscore
471 gen labourscore=labourscor*100
472 sum labourscore
473 bysort qualification1: sum labourscore
474 oneway labourscore qualification1, bonferroni tabulate // test of significant differences between
    groups. The Bonferroni test reveal that there is no statistical difference between Medic and
    Midwives, but there is between Medic and Nurses
475
476 * Main steps of active phase management (GATPA)
477 cap drop gatpa
478 gen gatpa=.
479 foreach v of var oxytocin controlledcordpull uterinemassage examinationplacenta examinationvagina{
480     replace gatpa=1 if `v'==1
481     replace gatpa=0 if `v'==0
482 }
483 tab gatpa // 122 good responses to a set of 5 good practices against 189 wrong or partial responses
484
```

```
    label
cap drop labourscor1
egen labourscor1 = rowmean(oxytocin controlledcordpull uterinemassage examinationplacenta
examinationvagina) // mean score index
cap drop labourscore1
gen labourscore1=labourscor1*100
sum labourscore1
bysort qualification1: sum labourscore1
oneway labourscore1 qualification1, bonferroni tabulate

**# *2.Infection prevention during childbirth (1 question)

cap drop preventinfection
gen preventinfection=.
foreach v of var weargownetc washplusantiseptic sterilegloves washperinea steriledrapes{
    replace preventinfection=1 if `v'==1
    replace preventinfection=0 if `v'==0
}
tab preventinfection // 155 good responses to a set of 5 good practices against 156 wrong or
partial responses

alpha weargownetc washplusantiseptic sterilegloves washperinea steriledrapes, std item label
cap drop infectionscor
egen infectionscor = rowmean(weargownetc washplusantiseptic sterilegloves washperinea
steriledrapes)
cap drop infectionscore
gen infectionscore = infectionscor * 100
sum infectionscore
bysort qualification1: sum infectionscore
oneway infectionscore qualification1, bonferroni tabulate

**# *3.The management of malaria during pregnancy (2 questions)

* Immediate action (CAT) when pregnant woman consults with symptoms of severe malaria
```

```
gen severemalariaCAT=.
foreach v of var vitalsignspair admitnow quinedextroseIV bloodsample hbnchecked{
    replace severemalariaCAT=1 if `v'==1
    replace severemalariaCAT=0 if `v'==0
}
tab severemalariaCAT // 55 good responses to a set of 5 good practices against 256 wrong or
partial responses

alpha vitalsignspair admitnow quinedextroseIV bloodsample hbnchecked, std item label
cap drop malariascor
egen malariascor = rowmean(vitalsignspair admitnow quinedextroseIV bloodsample hbnchecked)
cap drop malariascore
gen malariascore = malariascor * 100
sum malariascore
bysort qualification1: sum malariascore
oneway malariascore qualification1, bonferroni tabulate

* Danger signs to check / monitor for pregnant women with suspicion of severe malaria
cap drop severemalariacheck
gen severemalariacheck=.
foreach v of var feverabove38 confusioncoma paleness jaundice foetalhealth dizziness bonejointpain
 dehydration{
    replace severemalariacheck=1 if `v'==1
    replace severemalariacheck=0 if `v'==0
}
tab severemalariacheck // 74 good responses to a set of 8 good practices against 237 wrong or
partial responses

alpha feverabove38 confusioncoma paleness jaundice foetalhealth dizziness bonejointpain
dehydration, std item label
cap drop malariascor1
egen malariascor1 = rowmean (feverabove38 confusioncoma paleness jaundice foetalhealth dizziness
bonejointpain dehydration)
cap drop malariascore1
```

```
546 gen malariascore1 = malariascor1 * 100
547 sum malariascore1
548 bysort qualification1: sum malariascore1
549 oneway malariascore1 qualification1, bonferroni tabulate
550
551 tabstat malariascore, by(qualification1) s(n p25 p50 p75 iqr)
552
553 **# *4.The management of postpartum haemorrhage (5 questions)
554
555 * Signs to check / monitor in case of important hemorrhage during labour / postpartum
556 cap drop hemorrhageMONITOR
557 gen hemorrhageMONITOR=.
558 foreach v of var uncontracteduterus chocksigns bleedingsize retention fullbladder
    birthcanallesions anemiasigns{
559     replace hemorrhageMONITOR=1 if `v'==1
560     replace hemorrhageMONITOR=0 if `v'==0
561 }
562 tab hemorrhageMONITOR // 193 good responses to a set of 7 good practices against 118 wrong or
    partial responses
563
564 alpha uncontracteduterus chocksigns bleedingsize retention fullbladder birthcanallesions
    anemiasigns, std item label
565 cap drop pphscor1
566 egen pphscor1 = rowmean (uncontracteduterus chocksigns bleedingsize retention fullbladder
    birthcanallesions anemiasigns)
567 cap drop pphscore1
568 gen pphscore1 = pphscor1 * 100
569 sum pphscore1
570 bysort qualification1: sum pphscore1
571 oneway pphscore1 qualification1, bonferroni tabulate
572
573 * Immediate actions in case of important hemorrhage during labour / postpartum
574 cap drop hemorrhageACTIONS
575 gen hemorrhageACTIONS=.
```

```
foreach v of var fundusmassage emptybladder ergometry intravenousfluids bloodsamplehbn dechirures manualextraction seeDrSpecialist trendelenburg{
    replace hemorrhageACTIONS=1 if `v'==1
    replace hemorrhageACTIONS=0 if `v'==0
}
tab hemorrhageACTIONS // 66 good responses to a set of 9 good practices against 245 wrong or partial responses

alpha fundusmassage emptybladder ergometry intravenousfluids bloodsamplehbn dechirures manualextraction seeDrSpecialist trendelenburg, std item label
cap drop pphscor2
egen pphscor2 = rowmean (fundusmassage emptybladder ergometry intravenousfluids bloodsamplehbn dechirures manualextraction seeDrSpecialist trendelenburg)
cap drop pphscore2
gen pphscore2 = pphscor2 * 100
sum pphscore2
bysort qualification1: sum pphscore2
oneway pphscore2 qualification1, bonferroni tabulate

* Actions to take in case of retained placenta
cap drop retainedplacenta
gen retainedplacenta=.
foreach v of var emptybladder1 tractioncord repeatoxytocin manualremovalplac IVfluids vitalsigns1 contracteduterus bloodtype prepareforoperation referDrSpecialist{
    replace retainedplacenta=1 if `v'==1
    replace retainedplacenta=0 if `v'==0
}
tab retainedplacenta // 39 good responses to a set of 10 good practices against 272 wrong or partial responses

alpha emptybladder1 tractioncord repeatoxytocin manualremovalplac IVfluids vitalsigns1 contracteduterus bloodtype prepareforoperation referDrSpecialist, std item label
cap drop pphscor3
egen pphscor3 = rowmean (emptybladder1 tractioncord repeatoxytocin manualremovalplac IVfluids
```

```
    vitalsigns1 contracteduterus bloodtype prepareforoperation referDrSpecialist)
603 cap drop pphscore3
604 gen pphscore3 = pphscor3 * 100
605 sum pphscore3
606 bysort qualification1: sum pphscore3
607 oneway pphscore3 qualification1, bonferroni tabulate
608
609 * Signs to check / monitor when a pregnant woman presents with general malaise
610 cap drop signsgeneralmalaise
611 gen signsgeneralmalaise=.
612 foreach v of var highpulse highfever septicshock tenderuterus badsmellinglochia sensitiveabdomen{
613     replace signsgeneralmalaise=1 if `v'==1
614     replace signsgeneralmalaise=0 if `v'==0
615 }
616 tab signsgeneralmalaise // 182 good responses to a set of 6 good practices against 129 wrong or
    partial responses
617
618 alpha highpulse highfever septicshock tenderuterus badsmellinglochia sensitiveabdomen, std item
    label
619 cap drop pphscor4
620 egen pphscor4 = rowmean (highpulse highfever septicshock tenderuterus badsmellinglochia
    sensitiveabdomen)
621 cap drop pphscore4
622 gen pphscore4 = pphscor4 * 100
623 sum pphscore4
624 bysort qualification1: sum pphscore4
625 oneway pphscore4 qualification1, bonferroni tabulate
626
627 * What (actions) to undertake in practice if a woman presents with unsafe / incomplete abortion
628 cap drop unsafeabortion
629 gen unsafeabortion=.
630 foreach v of var bloodflow vitalsigns2 IVfluids1 antibiotics1 performMVA vaginalexam
    dilationcurettage counseling referDrSpecialist1{
631     replace unsafeabortion=1 if `v'==1
```

```
632         replace unsafeabortion=0 if `v'==0
633     }
634     tab unsafeabortion // 19 good responses to a set of 9 good practices against 292 wrong or partial
        responses
635
636     alpha bloodflow vitalsigns2 IVfluids1 antibiotics1 performMVA vaginalexam dilationcurettage
        counseling referDrSpecialist1, std item label
637     cap drop pphscor5
638     egen pphscor5 = rowmean (bloodflow vitalsigns2 IVfluids1 antibiotics1 performMVA vaginalexam
        dilationcurettage counseling referDrSpecialist1)
639     cap drop pphscore5
640     gen pphscore5 = pphscor5 * 100
641     sum pphscore5
642     bysort qualification1: sum pphscore5
643     oneway pphscore5 qualification1, bonferroni tabulate
644
645     **# *5.The management of preeclampsia and eclampsia (6 questions)
646
647     * Pregnant woman, 24 year-old, presents with headaches and abdominal pain. What actions?
648     cap drop headachesaabdopain
649     gen headachesaabdopain=.
650     foreach v of var pregnancyterm temperatureBP paincharacterization visualblurring{
651         replace headachesaabdopain=1 if `v'==1
652         replace headachesaabdopain=0 if `v'==0
653     }
654     tab headachesaabdopain // 76 good responses to a set of 4 good practices against 235 wrong or
        partial responses
655
656     alpha pregnancyterm temperatureBP paincharacterization visualblurring, std item label
657     cap drop headachescor1
658     egen headachescor1 = rowmean (pregnancyterm temperatureBP paincharacterization visualblurring)
659     cap drop headachescore1
660     gen headachescore1 = headachescor1 * 100
661     sum headachescore1
```

```
662 bysort qualification1: sum headachescore1
663 oneway headachescore1 qualification1, bonferroni tabulate
664
665 * If you suspect severe preeclampsia, what signs to check?
666 cap drop severepreeclampsia
667 gen severepreeclampsia=.
668 foreach v of var diastolehigh intenseheadache visualblur epigatricpain proteinuria{
669     replace severepreeclampsia=1 if `v'==1
670     replace severepreeclampsia=0 if `v'==0
671 }
672 tab severepreeclampsia // 192 good responses to a set of 5 good practices against 119 wrong or
    partial responses
673
674 alpha diastolehigh intenseheadache visualblur epigatricpain proteinuria, std item label
675 cap drop headachescor2
676 egen headachescor2 = rowmean (diastolehigh intenseheadache visualblur epigatricpain proteinuria)
677 cap drop headachescore2
678 gen headachescore2 = headachescor2 * 100
679 sum headachescore2
680 bysort qualification1: sum headachescore2
681 oneway headachescore2 qualification1, bonferroni tabulate
682
683 * Essential monitoring elements in case of severe preeclampsia
684 cap drop monitorseverepreecl
685 gen monitorseverepreecl=.
686 foreach v of var infusionofsolutes monitoroverloads signsofOAP diuresisproteinuria hourlyvsrefBCF
    coagulation{
687     replace monitorseverepreecl=1 if `v'==1
688     replace monitorseverepreecl=0 if `v'==0
689 }
690 tab monitorseverepreecl // 25 good responses to a set of 6 good practices against 286 wrong or
    partial responses
691
692 alpha infusionofsolutes monitoroverloads signsofOAP diuresisproteinuria hourlyvsrefBCF coagulation
```

```
, std item label
cap drop headachescor3
egen headachescor3 = rowmean (infusionofsolutes monitoroverloads signsofOAP diuresisproteinuria hourlyvsrefBCF coagulation)
cap drop headachescore3
gen headachescore3 = headachescor3 * 100
sum headachescore3
bysort qualification1: sum headachescore3
oneway headachescore3 qualification1, bonferroni tabulate

* Practices to follow in case of confirmed severe preeclampsia
cap drop severepreeclampsiaCAT
gen severepreeclampsiaCAT=.
foreach v of var admit informsiblings sulphatemgn continuesulfate maintenancedose sulfate24afterdelivery{
    replace severepreeclampsiaCAT=1 if `v'==1
    replace severepreeclampsiaCAT=0 if `v'==0
}
tab severepreeclampsiaCAT // 19 good responses to a set of 6 good practices against 292 wrong or partial responses

alpha admit informsiblings sulphatemgn continuesulfate maintenancedose sulfate24afterdelivery, std item label
cap drop headachescor4
egen headachescor4 = rowmean (admit informsiblings sulphatemgn continuesulfate maintenancedose sulfate24afterdelivery)
cap drop headachescore4
gen headachescore4 = headachescor4 * 100
sum headachescore4
bysort qualification1: sum headachescore4
oneway headachescore4 qualification1, bonferroni tabulate

* Precautions (things to confirm) before administering magnesium sulfate (dose d'entretien)
cap drop precautions
```

```
gen precautions=.
foreach v of var respiratoryrate patellarreflexes diuresis{
    replace precautions=1 if `v'==1
    replace precautions=0 if `v'==0
}
tab precautions // 66 good responses to a set of 3 good practices against 245 wrong or partial responses

alpha respiratoryrate patellarreflexes diuresis, std item label
cap drop headachescor5
egen headachescor5 = rowmean (respiratoryrate patellarreflexes diuresis)
cap drop headachescore5
gen headachescore5 = headachescor5 * 100
sum headachescore5
bysort qualification1: sum headachescore5
oneway headachescore5 qualification1, bonferroni tabulate

* If heart arrest following magnesium sulfate, what do you do
cap drop heartarrest
gen heartarrest=.
foreach v of var assistedventilation calciumgluconate{
    replace heartarrest=1 if `v'==1
    replace heartarrest=0 if `v'==0
}
tab heartarrest // 136 good responses to a set of 2 good practices against 175 wrong or partial responses

alpha assistedventilation calciumgluconate, std item label
cap drop headachescor6
egen headachescor6 = rowmean (assistedventilation calciumgluconate)
cap drop headachescore6
gen headachescore6 = headachescor6 * 100
sum headachescore6
bysort qualification1: sum headachescore6
```

```
753 oneway headachescore6 qualification1, bonferroni tabulate
754
755 **# *6.Immediate newborn care (3 questions)
756
757 * Immediate essential newborn care (after childbirth)
758 cap drop newborncare
759 gen newborncare=.
760 foreach v of var wipe cordcare breathcheck thermalprotection breastfeeding1h newbornexam1h
    weighbaby ocularprophylaxis{
761     replace newborncare=1 if `v'==1
762     replace newborncare=0 if `v'==0
763 }
764 tab newborncare // 191 good responses to a set of 8 good practices against 120 wrong or partial
    responses
765
766 alpha wipe cordcare breathcheck thermalprotection breastfeeding1h newbornexam1h weighbaby
    ocularprophylaxis, std item label
767 cap drop newborncarescor1
768 egen newborncarescor1 = rowmean (wipe cordcare breathcheck thermalprotection breastfeeding1h
    newbornexam1h weighbaby ocularprophylaxis)
769 cap drop newborncarescore1
770 gen newborncarescore1 = newborncarescor1 * 100
771 sum newborncarescore1
772 bysort qualification1: sum newborncarescore1
773 oneway newborncarescore1 qualification1, bonferroni tabulate
774
775 * What are practical actions (what do you do) if a newborn does not breath (perinatal asphyxia)
776 cap drop asphyxia
777 gen asphyxia=.
778 foreach v of var clearairways drywrapbaby heatsource ambubag cardiacmassage suctionifmeconium{
779     replace asphyxia=1 if `v'==1
780     replace asphyxia=0 if `v'==0
781 }
782 tab asphyxia // 210 good responses to a set of 6 good practices against 101 wrong or partial
```

```
    responses
783
784 alpha clearairways drywrapbaby heatsource ambubag cardiacmassage suctionifmeconium, std item label
785 cap drop newborncarescor2
786 egen newborncarescor2 = rowmean (clearairways drywrapbaby heatsource ambubag cardiacmassage
    suctionifmeconium)
787 cap drop newborncarescore2
788 gen newborncarescore2 = newborncarescor2 * 100
789 sum newborncarescore2
790 bysort qualification1: sum newborncarescore2
791 oneway newborncarescore2 qualification1, bonferroni tabulate
792
793 * The prevention of mother-to-child transmission of VIH (1 question). PMTCT practices during
    labour
794 cap drop PMTCTpractice
795 gen PMTCTpractice=.
796 foreach v of var nevirapinifVIHp checkHIVstatusifUnknown nevirapinbabyifHIVp{
797     replace PMTCTpractice=1 if `v'==1
798     replace PMTCTpractice=0 if `v'==0
799 }
800 tab PMTCTpractice // 278 good responses to a set of 3 good practices against 33 wrong or partial
    responses
801
802 alpha nevirapinifVIHp checkHIVstatusifUnknown nevirapinbabyifHIVp, std item label
803 cap drop newborncarescor3
804 egen newborncarescor3 = rowmean (nevirapinifVIHp checkHIVstatusifUnknown nevirapinbabyifHIVp)
805 cap drop newborncarescore3
806 gen newborncarescore3 = newborncarescor3 * 100
807 sum newborncarescore3
808 bysort qualification1: sum newborncarescore3
809 oneway newborncarescore3 qualification1, bonferroni tabulate
810
811 **# ** OVERALL SKILLS ASSESSMENT SCORE **
812
```

```
    pphscore3 pphscore4 pphscore5 headachescore1 headachescore2 headachescore3 headachescore4
    headachescore5 headachescore6 newborncarescore1 newborncarescore2 newborncarescore3
814 * 1. Labour monitoring (2 questions)
815 alpha labourscore labourscore1, std item label
816 cap drop labourOV
817 egen labourOV = rowmean (labourscore labourscore1)
818 sum labourOV
819 bysort qualification1: sum labourOV
820 oneway labourOV qualification1, bonferroni tabulate
821
822 * 2. Infection prevention (1 question)
823 sum infectionscore
824 bysort qualification1: sum infectionscore
825 oneway infectionscore qualification1, bonferroni tabulate
826
827 * 3. Malaria management (2 questions)
828 alpha malariascore malariascore1, std item label
829 cap drop malariaOV
830 egen malariaOV = rowmean (malariascore malariascore1)
831 sum malariaOV
832 bysort qualification1: sum malariaOV
833 oneway malariaOV qualification1, bonferroni tabulate
834
835 * 4. Postpartum hemorrhage management (5 questions)
836 alpha pphscore1 pphscore2 pphscore3 pphscore4 pphscore5, std item label
837 cap drop pphOV
838 egen pphOV = rowmean (pphscore1 pphscore2 pphscore3 pphscore4 pphscore5)
839 sum pphOV
840 bysort qualification1: sum pphOV
841 oneway pphOV qualification1, bonferroni tabulate
842
843 * 5. Severe preeclampsia and eclampsia management (6 questions)
844 alpha headachescore1 headachescore2 headachescore3 headachescore4 headachescore5 headachescore6,
    std item label
```

```
cap drop eclampsiaOV
egen eclampsiaOV = rowmean (headachescore1 headachescore2 headachescore3 headachescore4 headachescore5 headachescore6)
sum eclampsiaOV
bysort qualification1: sum eclampsiaOV
oneway eclampsiaOV qualification1, bonferroni tabulate

* 6. Immediate newborn care (3 questions)
alpha newborncarescore1 newborncarescore2 newborncarescore3, std item label
cap drop newbornOV
egen newbornOV = rowmean (newborncarescore1 newborncarescore2 newborncarescore3)
sum newbornOV
bysort qualification1: sum newbornOV
oneway newbornOV qualification1, bonferroni tabulate

* Overall
alpha labourscore labourscore1 infectionscore malariascore malariascore1 pphscore1 pphscore2 pphscore3 pphscore4 pphscore5 headachescore1 headachescore2 headachescore3 headachescore4 headachescore5 headachescore6 newborncarescore1 newborncarescore2 newborncarescore3, std item label
cap drop overallscoreskill
egen overallscoreskill = rowmean (labourscore labourscore1 infectionscore malariascore malariascore1 pphscore1 pphscore2 pphscore3 pphscore4 pphscore5 headachescore1 headachescore2 headachescore3 headachescore4 headachescore5 headachescore6 newborncarescore1 newborncarescore2 newborncarescore3)
cap drop overallscoreskills
gen overallscoreskills = overallscoreskill
sum overallscoreskills
bysort qualification1: sum overallscoreskills
oneway overallscoreskills qualification1, bonferroni tabulate
* Pairwise comparison between the groups
pwmean overallscoreskills, over(qualification1) effects cimeans mcompare(bonferroni)

save datasetPROVIDER.dta, replace

```

```
**# * Fitting a regression

use datasetPROVIDER, clear

*examine the variables in the model to check for possible errors
tab finalconfidence
pwcorr finalconfidence faci_type sex qualification1 EmONC_training agecat experience1 deliveryexp,
 star(0.05) sig // Corr matrix of regressors
graph matrix finalconfidence faci_type sex qualification1 EmONC_training agecat experience1
deliveryexp, half
*examining the dependent variable
sum overallscoreskills, d
// Skewness = -.4824842 means that the variable is skewed to the left and Kurtosis = 2.307144
means that the trails are too thick (see page 283 stata book "a gentle intro to stata, sixth
edited version)
histogram overallscoreskills, normal kdensity
hangroot overallscoreskills, bar
sktest overallscoreskills // test of skewness shows that skewness=.5765448, p = 0.0001 and
kurtosis=2.676245, p=0.2212 hence the outcome variable is arguably normally distributed
*examining predictors
describe finalconfidence faci_type sex qualification1 EmONC_training agecat experience1 deliveryexp
summarize finalconfidence faci_type sex qualification1 EmONC_training agecat experience1
deliveryexp
*fitting a regression
regress overallscoreskills finalconfidence i.faci_type i.sex ib3.qualification1 i.EmONC_training i
.agecat i.experience1 i.deliveryexp, beta
*regress condifencemean i.faci_type i.sex ib3.qualification1 i.EmONC_training age experience
number_deliveries, beta
*examining residuals (regresion assumes normality of residuals)
predict resi, residuals
sum resi, d
sktest resi // residuals are arguably normally distributed. Plus, n=311 is a relatively big
sample to support statistical tests of normality
*However, I use a robust command to remedy any normality above issue
```

```
.agecat i.experience1 i.deliveryexp, vce(robust)
*diagnising the regression model
*1. Multicollineality checks - variance inflation factor
regress overallscoreskills finalconfidence i.faci_type i.sex ib3.qualification1 i.EmONC_training i
.agecat, beta
estat vif // variance inflation factor. There is no multicollineality among predictors (rule of
thumb VIF < 10) which is < 1.4 across all predictors. However, this was obtained after removing
the "number of years of work experience" as this was highly correlated with the number of
deliveries with an overall mean VIF of > 4. After removing the correlated predictor, the mean VIF
dropped to 1.17 which is a great score of non-collineality

** FINAL robust regression models
regress overallscoreskills finalconfidence i.faci_type i.sex ib3.qualification1 i.EmONC_training
age number_deliveries, beta
regress overallscoreskills finalconfidence i.faci_type i.sex ib3.qualification1 i.EmONC_training
age number_deliveries, vce(robust)

**# Forest graphs on regressions [confidence and clinical skills]
ssc install coefplot
ssc install metan
ssc install admetan

describe overallscoreskills finalconfidence faci_type sex qualification1 EmONC_training age
number_deliveries
label var finalconfidence "Self-reported confidence"
label var faci_type "Facility"
label var sex "Sex"
label var qualification1 "Qualification"
label var EmONC_training "EmONC training"
label var age "Age category"
label var number_deliveries "Experience"

quietly regress overallscoreskills finalconfidence i.faci_type i.sex ib3.qualification1 i.
EmONC_training age number_deliveries
```

```
923 estimates store Skills
924 quietly regress condifencemean1 i.faci_type i.sex ib3.qualification1 i.EmONC_training age
    number_deliveries
925 estimates store Confidence
926
927 coefplot Skills Confidence, drop(_cons) xline(0)
928
929 metan overallscoreskills condifencemean1, nooverall eform
930 forestplot overallscoreskills condifencemean1, subgroup(qualification1)
931
932
933 *** Competence assessment ***
934
935 use datasetPROVIDER, clear
936
937 **# * Vignette #1. Labour monitoring
938 br BCF cranefoetal dilatation head contractions bpmonitoring respirationmother temperaturemother
    pulsemother urinemother
939 br oxytocin controlledcordpull uterinemassage examinationplacenta examinationvagina
940 br weargownetc washplusantiseptic sterilegloves washperinea steriledrapes
941
942 * Filling a 1PL IRT model for vignette 1
943 rename (BCF cranefoetal dilatation head contractions bpmonitoring respirationmother
    temperaturemother pulsemother urinemother oxytocin controlledcordpull uterinemassage
    examinationplacenta examinationvagina weargownetc washplusantiseptic sterilegloves washperinea
    steriledrapes) (item1 item2 item3 item4 item5 item6 item7 item8 item9 item10 item11 item12 item13
    item14 item15 item16 item17 item18 item19 item20)
944
945 * Difficulties and discrimanation of items
946 global vignette1items item1 item2 item3 item4 item5 item6 item7 item8 item9 item10 item11 item12
    item13 item14 item15 item16 item17 item18 item19 item20
947
948 br $vignette1items // Bwose first vignette items
949 irt 1pl $vignette1items // Difficulty and overall discrimanation of vignette items
```

```
950 estat report, byparm sort(b) // Sorting vignette items by difficulty level
951 foreach v of var $vignette1items{
952     tab `v'
953 }
954 irtgraph icc, blocation xlabel(, alt) // Item characteristic curves
955 irtgraph tcc, thetalines(-1.96 0 1.96) // Test characteristic curve
956 irtgraph icc, blocation xlabel(, alt) xlabel(-4 -3.5 -3 -2.5 -2 -1.5 -1 -0.5 0 1 1.5 2 2.5 3 3.5 4)
957
958 irtgraph tif, se
959 predict rasch_score, latent // Estimating the latent score "competence = theta"
960 sum rasch_score // empirical Bayes means for theta
961 tab rasch_score // empirical Bayes means for theta
962 br rasch_score
963 bysort qualification1: sum rasch_score, d
964 tab qualification1 if rasch_score>-0.6 & rasch_score<-0.4 // who is the instrument made for?
    (Nurses)
965
966 graph hbox rasch_score, over(qualification1)
967
968 regress rasch_score finalconfidence i.faci_type i.sex i.EmONC_training age number_deliveries
969
970
971 **# * Vignette #2. Parturient presenting with severe malaria or fever
972 br feverabove38 confusioncoma paleness jaundice foetalhealth dizziness bonejointpain dehydration
    vitalsignspair admitnow quinedextroseIV bloodsample hbnchecked
973
974 rename (feverabove38 confusioncoma paleness jaundice foetalhealth dizziness bonejointpain
    dehydration vitalsignspair admitnow quinedextroseIV bloodsample hbnchecked) (item21 item22 item23
    item24 item25 item26 item27 item28 item29 item30 item31 item32 item33)
975
976 global vignette2items item21 item22 item23 item24 item25 item26 item27 item28 item29 item30 item31
     item32 item33
977
978 br $vignette2items
```

```
* All providers
irt 1pl $vignette2items // Difficulty and overall discrimanation of vignette items
estat report, byparm sort(b) // Sorting vignette items by difficulty level
irtgraph icc, blocation xlabel(, alt) // Item characteristic curves
irtgraph tcc, thetalines(-1.96 0 1.96) // Test characteristic curve
foreach v of var $vignette2items{
    tab `v'
}
irtgraph tif, se
predict rasch_score1, latent // Estimating the latent score "competence = theta"
sum rasch_score1 // empirical Bayes means for theta
tab rasch_score1 // empirical Bayes means for theta
br rasch_score1
bysort qualification1: sum rasch_score1, d
tab qualification1 if rasch_score1>0.5 & rasch_score1<1.5 // who is the instrument made for?
(Nurses)

graph hbox rasch_score1, over(qualification1)

* Medical doctors
use datasetPROVIDER, clear
keep if qualification1==1
browse
irt 1pl item21 item22 item24 item25 item26 item27 item28 item29 item30 item31 item32 item33 //
Difficulty and overall discrimanation of vignette items
estat report, byparm sort(b) // Sorting vignette items by difficulty level
irtgraph icc, blocation xlabel(, alt) // Item characteristic curves
irtgraph tcc, thetalines(-1.96 0 1.96) // Test characteristic curve

* Midwives
clear
use datasetPROVIDER, clear
keep if qualification1==2
browse
```

```
irt 1pl item21 item22 item23 item24 item25 item26 item27 item28 item29 item30 item31 item32 item33
 // Difficulty and overall discrimanation of vignette items
estat report, byparm sort(b) // Sorting vignette items by difficulty level
irtgraph icc, blocation xlabel(, alt) // Item characteristic curves
irtgraph tcc, thetalines(-1.96 0 1.96) // Test characteristic curve

* Nurses
clear
use datasetPROVIDER, clear
keep if qualification1==3
browse
irt 1pl item21 item22 item23 item24 item25 item26 item27 item28 item29 item30 item31 item32 item33
 // Difficulty and overall discrimanation of vignette items
estat report, byparm sort(b) // Sorting vignette items by difficulty level
irtgraph icc, blocation xlabel(, alt) // Item characteristic curves
irtgraph tcc, thetalines(-1.96 0 1.96) // Test characteristic curve


**# * Vignette #3. Mother presenting with postpartum haemorrhage

* Signs to check / monitor in case of important hemorrhage during labour / postpartum
br uncontracteduterus chocksigns bleedingsize retention fullbladder birthcanallesions anemiasigns
* Immediate actions in case of important hemorrhage during labour / postpartum
br fundusmassage emptybladder ergometry intravenousfluids bloodsamplehbn dechirures
manualextraction seeDrSpecialist trendelenburg
* Actions to take in case of retained placenta
br emptybladder1 tractioncord repeatoxytocin manualremovalplac IVfluids vitalsigns1
contracteduterus bloodtype prepareforoperation referDrSpecialist
* Signs to check / monitor when a pregnant woman presents with general malaise
br highpulse highfever septicshock tenderuterus badsmellinglochia sensitiveabdomen
* What (actions) to undertake in practice if a woman presents with unsafe / incomplete abortion
br bloodflow vitalsigns2 IVfluids1 antibiotics1 performMVA vaginalexam dilationcurettage
counseling referDrSpecialist1

```

```
* All items
br uncontracteduterus chocksigns bleedingsize retention fullbladder birthcanallesions anemiasigns fundusmassage emptybladder ergometry intravenousfluids bloodsamplehbn dechirures manualextraction seeDrSpecialist trendelenburg emptybladder1 tractioncord repeatoxytocin manualremovalplac IVfluids vitalsigns1 contracteduterus bloodtype prepareforoperation referDrSpecialist highpulse highfever septicshock tenderuterus badsmellinglochia sensitiveabdomen bloodflow vitalsigns2 IVfluids1 antibiotics1 performMVA vaginalexam dilationcurettage counseling referDrSpecialist1

rename (uncontracteduterus chocksigns bleedingsize retention fullbladder birthcanallesions anemiasigns fundusmassage emptybladder ergometry intravenousfluids bloodsamplehbn dechirures manualextraction seeDrSpecialist trendelenburg emptybladder1 tractioncord repeatoxytocin manualremovalplac IVfluids vitalsigns1 contracteduterus bloodtype prepareforoperation referDrSpecialist highpulse highfever septicshock tenderuterus badsmellinglochia sensitiveabdomen bloodflow vitalsigns2 IVfluids1 antibiotics1 performMVA vaginalexam dilationcurettage counseling referDrSpecialist1) (item34 item35 item36 item37 item38 item39 item40 item41 item42 item43 item44 item45 item46 item47 item48 item49 item50 item51 item52 item53 item54 item55 item56 item57 item58 item59 item60 item61 item62 item63 item64 item65 item66 item67 item68 item69 item70 item71 item72 item73 item74)

global vignette3items item34 item35 item36 item37 item38 item39 item40 item41 item42 item43 item44 item45 item46 item47 item48 item49 item50 item51 item52 item53 item54 item55 item56 item57 item58 item59 item60 item61 item62 item63 item64 item65 item66 item67 item68 item69 item70 item71 item72 item73 item74

br $vignette3items

irt 1pl $vignette3items // Difficulty and overall discrimanation of vignette items
estat report, byparm sort(b) // Sorting vignette items by difficulty level
irtgraph icc, blocation xlabel(, alt) // Item characteristic curves
foreach v of var $vignette3items{
    tab `v'
}
irtgraph tcc, thetalines(-1.96 0 1.96) // Test characteristic curve
irtgraph tif, se
```

```
predict rasch_score2, latent // Estimating the latent score "competence = theta"
sum rasch_score2 // empirical Bayes means for theta
tab rasch_score2 // empirical Bayes means for theta
br rasch_score2
bysort qualification1: sum rasch_score2, d
tab qualification1 if rasch_score2>-0.5 & rasch_score2<0.5 // who is the instrument made for? (Nurses)

graph hbox rasch_score2, over(qualification1)

* Medical doctors
clear
use datasetPROVIDER, clear
keep if qualification1==1
browse
irt 1pl item34 item35 item36 item38 item40 item41 item42 item44 item45 item46 item47 item48 item49 item50 item51 item52 item53 item54 item55 item56 item57 item58 item59 item60 item61 item63 item64 item65 item66 item67 item68 item69 item70 item71 item72 item73 item74 // Difficulty and overall discrimanation of vignette items
estat report, byparm sort(b) // Sorting vignette items by difficulty level
irtgraph icc, blocation xlabel(, alt) // Item characteristic curves
irtgraph tcc, thetalines(-1.96 0 1.96) // Test characteristic curve

* Midwives
clear
use datasetPROVIDER, clear
keep if qualification1==2
browse
irt 1pl $vignette3items // Difficulty and overall discrimanation of vignette items
estat report, byparm sort(b) // Sorting vignette items by difficulty level
irtgraph icc, blocation xlabel(, alt) // Item characteristic curves
irtgraph tcc, thetalines(-1.96 0 1.96) // Test characteristic curve

* Nurses
```

```
clear
use datasetPROVIDER, clear
keep if qualification1==3
browse
irt 1pl $vignette3items // Difficulty and overall discrimanation of vignette items
estat report, byparm sort(b) // Sorting vignette items by difficulty level
irtgraph icc, blocation xlabel(, alt) // Item characteristic curves
irtgraph tcc, thetalines(-1.96 0 1.96) // Test characteristic curve

**# * Vignette #4. Parturient with severe preeclampsia or eclampsia

* Pregnant woman, 24 year-old, presents with headaches and abdominal pain. What actions?
br pregnancyterm temperatureBP paincharacterization visualblurring
* If you suspect severe preeclampsia, what signs to check?
br diastolehigh intenseheadache visualblur epigatricpain proteinuria
* Essential monitoring elements in case of severe preeclampsia
br infusionofsolutes monitoroverloads signsofOAP diuresisproteinuria hourlyvsrefBCF coagulation
* Practices to follow in case of confirmed severe preeclampsia
br sulphatemgn continuesulfate maintenancedose sulfate24afterdelivery
* Precautions (things to confirm) before administering magnesium sulfate (dose d'entretion)
br respiratoryrate patellarreflexes diuresis
* If heart arrest following magnesium sulfate, what do you do
br assistedventilation calciumgluconate

* All items
br pregnancyterm temperatureBP paincharacterization visualblurring diastolehigh intenseheadache
visualblur epigatricpain proteinuria infusionofsolutes monitoroverloads signsofOAP
diuresisproteinuria hourlyvsrefBCF coagulation sulphatemgn continuesulfate maintenancedose
sulfate24afterdelivery respiratoryrate patellarreflexes diuresis assistedventilation
calciumgluconate

rename (pregnancyterm temperatureBP paincharacterization visualblurring diastolehigh
intenseheadache visualblur epigatricpain proteinuria infusionofsolutes monitoroverloads signsofOAP
 diuresisproteinuria hourlyvsrefBCF coagulation sulphatemgn continuesulfate maintenancedose
```

```
    sulfate24afterdelivery respiratoryrate patellarreflexes diuresis assistedventilation
    calciumgluconate) (item75 item76 item77 item78 item79 item80 item81 item82 item83 item84 item85
    item86 item87 item88 item89 item90 item91 item92 item93 item94 item95 item96 item97 item98)
1115
1116 global vignette4items item75 item76 item77 item78 item79 item80 item81 item82 item83 item84 item85
     item86 item87 item88 item89 item90 item91 item92 item94 item95 item96 item97 item98
1117
1118 br $vignette4items
1119
1120 irt 1pl $vignette4items // Difficulty and overall discrimanation of vignette items
1121 foreach v of var $vignette4items{
1122     tab `v'
1123 }
1124 estat report, byparm sort(b) // Sorting vignette items by difficulty level
1125 irtgraph icc, blocation xlabel(, alt) // Item characteristic curves
1126 irtgraph tcc, thetalines(-1.96 0 1.96) // Test characteristic curve
1127 irtgraph tif, se
1128 predict rasch_score3, latent // Estimating the latent score "competence = theta"
1129 sum rasch_score3 // empirical Bayes means for theta
1130 tab rasch_score3 // empirical Bayes means for theta
1131 br rasch_score3
1132 bysort qualification1: sum rasch_score3, d
1133 tab qualification1 if rasch_score3>0.5 & rasch_score3<1.2 // who is the instrument made for?
    (Nurses)
1134
1135 graph hbox rasch_score3, over(qualification1)
1136
1137 * Medical doctors
1138 clear
1139 use datasetPROVIDER, clear
1140 keep if qualification1==1
1141 browse
1142 irt 1pl item75 item77 item78 item79 item81 item82 item83 item84 item85 item86 item87 item88 item89
     item90 item91 item92 item94 item95 item96 item97 item98 // Difficulty and overall discrimanation
```

```
of vignette items
estat report, byparm sort(b) // Sorting vignette items by difficulty level
irtgraph icc, blocation xlabel(, alt) // Item characteristic curves
irtgraph tcc, thetalines(-1.96 0 1.96) // Test characteristic curve

* Midwives
clear
use datasetPROVIDER, clear
keep if qualification1==2
browse
irt 1pl $vignette4items // Difficulty and overall discrimanation of vignette items
estat report, byparm sort(b) // Sorting vignette items by difficulty level
irtgraph icc, blocation xlabel(, alt) // Item characteristic curves
irtgraph tcc, thetalines(-1.96 0 1.96) // Test characteristic curve

* Nurses
clear
use datasetPROVIDER, clear
keep if qualification1==3
browse
irt 1pl $vignette4items // Difficulty and overall discrimanation of vignette items
estat report, byparm sort(b) // Sorting vignette items by difficulty level
irtgraph icc, blocation xlabel(, alt) // Item characteristic curves
irtgraph tcc, thetalines(-1.96 0 1.96) // Test characteristic curve

**# * Vignette #5. Newborn with asphyxia or needing PMTCT

* Immediate essential newborn care (after childbirth)
br wipe cordcare breathcheck thermalprotection breastfeeding1h newbornexam1h weighbaby
ocularprophylaxis
* What are practical actions (what do you do) if a newborn does not breath (perinatal asphyxia)
br clearairways drywrapbaby heatsource ambubag cardiacmassage suctionifmeconium
* The prevention of mother-to-child transmission of VIH (1 question). PMTCT practices during
labour
```

```
1175
1176  * All items
1177  br wipe cordcare breathcheck thermalprotection breastfeeding1h newbornexam1h weighbaby
      ocularprophylaxis clearairways drywrapbaby heatsource ambubag cardiacmassage suctionifmeconium
      nevirapinifVIHp checkHIVstatusifUnknown nevirapinbabyifHIVp
1178
1179  rename (wipe cordcare breathcheck thermalprotection breastfeeding1h newbornexam1h weighbaby
      ocularprophylaxis clearairways drywrapbaby heatsource ambubag cardiacmassage suctionifmeconium
      nevirapinifVIHp checkHIVstatusifUnknown nevirapinbabyifHIVp) (item99 item100 item101 item102
      item103 item104 item105 item106 item107 item108 item109 item110 item111 item112 item113 item114
      item115)
1180
1181  global vignette5items item99 item100 item101 item102 item103 item104 item105 item106 item107
      item108 item109 item110 item111 item112 item113 item114 item115
1182
1183  br $vignette5items
1184
1185  foreach v of var $vignette5items{
1186      tab `v', m
1187  }
1188  irt 1pl $vignette5items // Difficulty and overall discrimanation of vignette items
1189  estat report, byparm sort(b) // Sorting vignette items by difficulty level
1190  irtgraph icc, blocation xlabel(, alt) // Item characteristic curves
1191  irtgraph tcc, thetalines(-1.96 0 1.96) // Test characteristic curve
1192  irtgraph tif, se
1193  predict rasch_score4, latent // Estimating the latent score "competence = theta"
1194  sum rasch_score4 // empirical Bayes means for theta
1195  tab rasch_score4 // empirical Bayes means for theta
1196  br rasch_score4
1197  bysort qualification1: sum rasch_score4, d
1198  tab qualification1 if rasch_score4>0.5 & rasch_score4<1.2 // who is the instrument made for?
      (Nurses)
1199
1200  graph hbox rasch_score4, over(qualification1)
```

```
1201
1202  * Medical doctors
1203  clear
1204  use datasetPROVIDER, clear
1205  keep if qualification1==1
1206  browse
1207  irt 1pl $vignette5items // Difficulty and overall discrimanation of vignette items
1208  estat report, byparm sort(b) // Sorting vignette items by difficulty level
1209  irtgraph icc, blocation xlabel(, alt) // Item characteristic curves
1210  irtgraph tcc, thetalines(-1.96 0 1.96) // Test characteristic curve
1211
1212  * Midwives
1213  clear
1214  use datasetPROVIDER, clear
1215  keep if qualification1==2
1216  browse
1217  irt 1pl $vignette5items // Difficulty and overall discrimanation of vignette items
1218  estat report, byparm sort(b) // Sorting vignette items by difficulty level
1219  irtgraph icc, blocation xlabel(, alt) // Item characteristic curves
1220  irtgraph tcc, thetalines(-1.96 0 1.96) // Test characteristic curve
1221
1222  * Nurses
1223  clear
1224  use datasetPROVIDER, clear
1225  keep if qualification1==3
1226  browse
1227  irt 1pl $vignette5items // Difficulty and overall discrimanation of vignette items
1228  estat report, byparm sort(b) // Sorting vignette items by difficulty level
1229  irtgraph icc, blocation xlabel(, alt) // Item characteristic curves
1230  irtgraph tcc, thetalines(-1.96 0 1.96) // Test characteristic curve
1231
1232  **# Overall EmONC competence exam
1233
1234  br item1 item2 item3 item4 item5 item6 item7 item8 item9 item10 item11 item12 item13 item14 item15
```

```
 item16 item17 item18 item19 item20 item21 item22 item23 item24 item25 item26 item27 item28 item29
 item30 item31 item32 item33 item34 item35 item36 item37 item38 item39 item40 item41 item42 item43
 item44 item45 item46 item47 item48 item49 item50 item51 item52 item53 item54 item55 item56 item57
 item58 item59 item60 item61 item62 item63 item64 item65 item66 item67 item68 item69 item70 item71
 item72 item73 item74 item75 item76 item77 item78 item79 item80 item81 item82 item83 item84 item85
 item86 item87 item88 item89 item90 item91 item92 item94 item95 item96 item97 item98 item99
item100 item101 item102 item103 item104 item105 item106 item107 item108 item109 item110 item111
item112 item113 item114 item115
1235
1236 global allitems item1 item2 item3 item4 item5 item6 item7 item8 item9 item10 item11 item12 item13
item14 item15 item16 item17 item18 item19 item20 item21 item22 item23 item24 item25 item26 item27
item28 item29 item30 item31 item32 item33 item34 item35 item36 item37 item38 item39 item40 item41
item42 item43 item44 item45 item46 item47 item48 item49 item50 item51 item52 item53 item54 item55
item56 item57 item58 item59 item60 item61 item62 item63 item64 item65 item66 item67 item68 item69
item70 item71 item72 item73 item74 item75 item76 item77 item78 item79 item80 item81 item82 item83
item84 item85 item86 item87 item88 item89 item90 item91 item92 item94 item95 item96 item97 item98
item99 item100 item101 item102 item103 item104 item105 item106 item107 item108 item109 item110
item111 item112 item113 item114 item115
1237
1238 br $allitems
1239 irt 1pl $allitems // Difficulty and overall discrimanation of vignette items
1240 estat report, byparm sort(b) // Sorting vignette items by difficulty level
1241 irtgraph icc, blocation xlabel(, alt) // Item characteristic curves
1242 irtgraph tcc, thetalines(-1.96 0 1.96) // Test characteristic curve
1243 irtgraph tif, se
1244 predict rasch_score_final, latent // Estimating the latent score "competence = theta"
1245 sum rasch_score_final // empirical Bayes means for theta
1246 sum rasch_score_final, d
1247 tab rasch_score_final // empirical Bayes means for theta
1248 br rasch_score_final
1249 bysort qualification1: sum rasch_score_final, d
1250 bysort qualification1: sum rasch_score_final
1251 tab qualification1 if rasch_score_final>-0.5 & rasch_score_final<0.5 // who is the instrument
made for?
```

```
1252
1253  graph hbox rasch_score_final, over(qualification1)
1254
1255  gen finalscore = 100 + (rasch_score_final - (-0.0000027)) * (15/0.9837) // rescaling the score to
      have mean = 100 and SD = 15
1256
1257  * Medical doctors
1258  clear
1259  use datasetPROVIDER, clear
1260  keep if qualification1==1
1261  browse
1262  irt 1pl item2 item3 item4 item6 item7 item8 item9 item10 item11 item12 item13 item14 item15 item16
       item17 item19 item20 item21 item22 item24 item25 item26 item27 item28 item29 item30 item31 item32
       item33 item34 item35 item36 item38 item40 item41 item42 item44 item45 item46 item47 item48 item49
       item50 item51 item52 item53 item54 item55 item56 item57 item58 item59 item60 item61 item63 item64
       item65 item66 item67 item68 item69 item70 item71 item72 item73 item74 item75 item77 item78 item79
       item81 item82 item83 item84 item85 item86 item87 item88 item89 item90 item91 item92 item94 item95
       item96 item97 item98 item99 item101 item102 item103 item104 item105 item106 item107 item108
      item109 item110 item111 item112 item113 item114 // Difficulty and overall discrimanation of
      vignette items
1263  estat report, byparm sort(b) // Sorting vignette items by difficulty level
1264  irtgraph icc, blocation xlabel(, alt) // Item characteristic curves
1265  irtgraph tcc, thetalines(-1.96 0 1.96) // Test characteristic curve
1266
1267  * Midwives
1268  clear
1269  use datasetPROVIDER, clear
1270  keep if qualification1==2
1271  browse
1272  irt 1pl item1 item2 item3 item4 item5 item6 item7 item8 item9 item10 item12 item13 item14 item15
      item16 item17 item18 item19 item20 item21 item22 item23 item24 item25 item26 item27 item28 item29
      item30 item31 item32 item33 item34 item35 item36 item37 item38 item39 item40 item41 item42 item43
      item44 item45 item46 item47 item48 item49 item50 item51 item52 item53 item54 item55 item56 item57
      item58 item59 item60 item61 item62 item63 item64 item65 item66 item67 item68 item69 item70 item71
```

```
    item86 item87 item88 item89 item90 item91 item92 item94 item95 item96 item97 item98 item99 item100
     item101 item102 item103 item104 item105 item106 item107 item108 item109 item110 item111 item112
    item113 item114 item115 // Difficulty and overall discrimanation of vignette items
1273 estat report, byparm sort(b) // Sorting vignette items by difficulty level
1274 irtgraph icc, blocation xlabel(, alt) // Item characteristic curves
1275 irtgraph tcc, thetalines(-1.96 0 1.96) // Test characteristic curve
1276
1277 * Nurses
1278 clear
1279 use datasetPROVIDER, clear
1280 keep if qualification1==3
1281 browse
1282 irt 1pl $allitems // Difficulty and overall discrimanation of vignette items
1283 estat report, byparm sort(b) // Sorting vignette items by difficulty level
1284 irtgraph icc, blocation xlabel(, alt) // Item characteristic curves
1285 irtgraph tcc, thetalines(-1.96 0 1.96) // Test characteristic curve
1286
1287 graph combine Graph_all_all.gph Graph_all_medics.gph Graph_all_midwives.gph Graph_all_nurses.gph
1288
1289 **# Table 1. Determinants of EmONC competence θ
1290 cls
1291 sum rasch_score_final, d // outcome
1292 codebook type_faci sex qualification1 type_employment EmONC_training agecat experience1
    deliveryexp
1293
1294 * Exclude medical doctors from sex variable
1295 cap drop sex_final
1296 gen sex_final=.
1297 replace sex_final=1 if sex==1 & qualification1!=1
1298 replace sex_final=2 if sex==2 & qualification1!=1
1299 tab sex_final
1300
1301 ** Checking formality of the outcome variable
1302 sum rasch_score_final, d // positively skewed variable
```

```
1304  sktest rasch_score_final
1305
1306  * Checking normality of residuals
1307  regress rasch_score_final i.type_faci i.qualification1 i.sex i.type_employment i.EmONC_training i.
      agecat i.experience1 i.deliveryexp
1308
1309  predict resid, residuals
1310  sum resid, d
1311  sktest resid
1312
1313  * Heteroskedasticity checks
1314  regress rasch_score_final i.type_faci i.qualification1 i.sex i.type_employment i.EmONC_training i.
      agecat i.experience1 i.deliveryexp
1315  predict rasch_hat
1316  preserve
1317  set seed 515
1318  twoway (scatter rasch_score_final rasch_hat) (lfit rasch_score_final rasch_hat)
1319
1320  * Residuals are not normally distributed. Use robust or bootstrap analysis
1321  regress rasch_score_final i.type_faci ib3.qualification1 i.sex i.type_employment i.EmONC_training
      i.agecat i.experience1 i.deliveryexp
1322
1323  regress rasch_score_final i.type_faci ib3.qualification1 i.sex i.type_employment i.EmONC_training
      i.agecat i.experience1 i.deliveryexp, vce(robust)
1324
1325  *** Final model using 10,000 bootstraps
1326  gen age_sq = age * age
1327  gen delivery_sq = number_deliveries * number_deliveries
1328
1329  regress rasch_score_final i.type_faci ib3.qualification1 i.sex_final i.type_employment i.
      EmONC_training age age_sq experience number_deliveries delivery_sq, vce(bootstrap, reps(10000))
1330
1331  *** Effects of qualification and EmONC training on EmONC competence
1332
```

```
1333  tab qualification1 EmONC_training
1334
1335  * Doctors who received EmONC training before
1336  cap drop doctor_trained
1337  gen doctor_trained=.
1338  replace doctor_trained = 1 if qualification1 == 1 & EmONC_training == 2
1339  replace doctor_trained = 2 if qualification1 == 1 & EmONC_training == 1
1340  label def training1 1 "Trained doctors" 2 "Not trained doctors"
1341  label val doctor_trained training1
1342  tab doctor_trained
1343
1344  * Midwives who received EmONC training before
1345  cap drop midwife_trained
1346  gen midwife_trained=.
1347  replace midwife_trained = 1 if qualification1 == 2 & EmONC_training == 2
1348  replace midwife_trained = 2 if qualification1 == 2 & EmONC_training == 1
1349  label def training2 1 "Trained midwives" 2 "Not trained midwives"
1350  label val midwife_trained training2
1351  tab midwife_trained
1352
1353  * Nurses who received EmONC training before
1354  cap drop nurse_trained
1355  gen nurse_trained=.
1356  replace nurse_trained = 1 if qualification1 == 3 & EmONC_training == 2
1357  replace nurse_trained = 2 if qualification1 == 3 & EmONC_training == 1
1358  label def training3 1 "Trained nurses" 2 "Not trained nurses"
1359  label val nurse_trained training3
1360  tab nurse_trained
1361
1362  ** Final regressions
1363  foreach v of var doctor_trained midwife_trained nurse_trained{
1364      regress rasch_score_final ib2.`v', vce(bootstrap, reps(10000))
1365  }
1366  regress rasch_score_final ib3.qualification1, vce(bootstrap, reps(10000))
```

```
1367  regress rasch_score_final i.EmONC_training, vce(bootstrap, reps(10000))
1368  regress rasch_score_final i.type_faci, vce(bootstrap, reps(10000)) // by type of facility using
      all providers
1369  regress rasch_score_final i.type_faci if qualification1!=1, vce(bootstrap, reps(10000)) // by
      type of facility using midwives and nurses only
1370  regress rasch_score_final i.type_faci if qualification1==3, vce(bootstrap, reps(10000)) // by
      type of facility using nurses only
1371
1372  ** Exploring regressions coefficients plot
1373
1374  quietly regress rasch_score_final i.type_faci i.sex i.type_employment i.EmONC_training i.agecat i.
      experience1 i.deliveryexp if qualification1==1
1375  estimates store nursecoeff
1376
1377  quietly regress rasch_score_final i.type_faci i.sex i.type_employment i.EmONC_training i.agecat i.
      experience1 i.deliveryexp if qualification1==2
1378  estimates store midwifecoeff
1379
1380  quietly regress rasch_score_final i.type_faci i.sex i.type_employment i.EmONC_training i.agecat i.
      experience1 i.deliveryexp if qualification1==3
1381  estimates store doctorcoeff
1382
1383  coefplot (nursecoeff, label(Nurses)) (midwifecoeff, label(Midwives)) (doctorcoeff, label(Doctors
      )), drop(_cons) xlin(0)
1384
1385  ** Analysis by facility type excluding doctors
1386
1387  codebook qualification1
1388  tab type_faci qualification1 if qualification1==3 // 152 nurses in BEmONC vs 105 in CEmONC
1389  tab type_faci qualification1 if qualification1==2 // 6 midwives in BEmONC vs 34 in CEmONC
1390  tab type_faci qualification1 if qualification1==1 // 1 doctor in BEmONC vs 13 in CEmONC
1391  bysort type_faci: sum rasch_score_final if qualification1!=1, d
1392  bysort type_faci: sum rasch_score_final if qualification1==3, d
1393
```

```
1394  **# EmONC competence test information function : Test validity assessment
1395
1396  tab qualification1 if rasch_score_final>-0.5 & rasch_score_final<0.5 // whom is the instrument
      made for?
1397
1398  save "datasetPROVIDER.dta", replace
1399
1400  /*******************************************************************************
1401
1402      END -. April 27th, 2024
1403
1404  *******************************************************************************/
```